



THE MATHEMATICAL
ASSOCIATION OF VICTORIA

MAV17

Achieving excellence in M.A.T.H.S | 7 - 8 Dec 2017



MINDSETS



ASSESSING



TARGETING



HANDS-ON



SHIFTING THE NARRATIVE

MAV17 CONFERENCE SYNOPSIS

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LA TROBE UNIVERSITY, BUNDOORA

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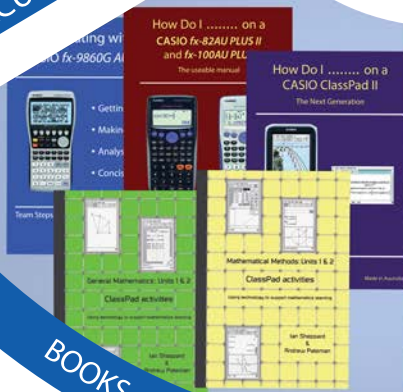
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WELCOME TO MAV17



The Mathematical Association of Victoria invites you to the 54th Annual Conference (MAV17) in Melbourne from Thursday 7 – Friday 8 December 2017. Our theme for this year's conference is *Achieving excellence in M.A.T.H.S.*

Join us in exploring the question, 'What does excellence look like?'

Australia's international standing in mathematics has been slipping, however Victorian schools continue to perform above the Organisation for Economic Co-operation and Development (OECD) average and at the upper end of results across Australia.

The MAV is dedicated to the improvement of mathematics education and at this year's annual conference delegates will investigate the most effective approaches, tools and new technology, that education professionals can use to improve student learning outcomes across all levels (early childhood to the senior years of secondary schools and beyond).

At MAV17, learn first-hand about the latest developments in mathematics education and be inspired by the wide-range of sessions available. Network with primary, secondary and tertiary teachers; teacher educators, researchers and academics; resource providers and representatives from government and other education bodies.

Don't miss out on this invaluable opportunity at MAV17 to share and discuss excellence in mathematics while making social and professional connections in a dynamic environment.

- Ann Downton, Conference Convenor

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SCHEDULE

THURSDAY 7 DECEMBER 2017	
8am-8.50am	Registration and expo open
9am-10am	Session A: Keynote presentations
10.15am-10.50am	Morning tea
11am-12pm	Session B: workshops
11am-1.20pm	Session B-C: workshops
12.10pm-1.10pm	Session C: workshops
1.10pm-2.20pm	Lunch
2.30pm-3.30pm	Session D: workshops
2.30pm-4.40pm	Session D-E: workshops
3.40pm-4.40pm	Session E: workshops
4.50pm-5.50pm	Happy hour
FRIDAY 8 DECEMBER 2017	
8am-8.50am	Registration and expo open
9am-10am	Session F: Keynote presentations
10.15am-10.50am	Morning tea
11am-12pm	Session G: workshops
11am-1.20pm	Session G-H: workshops
12.10pm-1.10pm	Session H: workshops
1.10pm-2.20pm	Lunch
2.30pm-3.30pm	Session I: workshops
2.30pm-4.40pm	Session I-J: workshops
3.40pm-4.40pm	Session J: workshops

PROGRAM

THURSDAY 7 DECEMBER 2017	
8am-8.50am	Registration and expo open
9am-10am	Session A: Keynote presentations <ul style="list-style-type: none"> • Catherine Attard • David Butler • Dan Finkel • Hayley Dureau • Sarah Hopkins • Dave Tout and Ross Turner
10.15am-10.50am	Morning tea
11am-12pm	Session B: workshops
11am-1.20pm	Session B-C: workshops
12.10pm-1.10pm	Session C: workshops
1.10pm-2.20pm	Lunch
2.30pm-3.30pm	Session D: workshops
2.30pm-4.40pm	Session D-E: workshops
3.40pm-4.40pm	Session E: workshops
4.50pm-5.50pm	Happy hour

FRIDAY 8 DECEMBER 2017	
8am-8.50am	Registration and expo open
9am-10am	Session F: Keynote presentations <ul style="list-style-type: none"> • David Clarke and Carmel Mesiti • Norman Do • Sarah Ferguson • Dan Finkel • Trish Jelbart and Nicole Merlich • Amy MacDonald
10.15am-10.50am	Morning tea
11am-12pm	Session G: workshops
11am-1.20pm	Session G-H: workshops
12.10pm-1.10pm	Session H: workshops
1.10pm-2.20pm	Lunch
2.30pm-3.30pm	Session I: workshops
2.30pm-4.40pm	Session I-J: workshops
3.40pm-4.40pm	Session J: workshops



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For more information, please visit latrobe.edu.au/transport-central

KEYNOTE PRESENTATIONS

In 2017 there will be six keynote presentations run at the beginning of each day. There will be a selection of keynote presentations each morning and you will need to choose one of these to attend.

The keynote presentations will be listed online as Session A (Thursday) and Session F (Friday).

CONFERENCE LUNCH

In 2017 lunch on both days will be in the Exhibition Hall from 1.10pm – 2.20pm.

EXTENDED SESSIONS

There are four extended sessions, B-C, D-E, G-H and I-J. These sessions run over two one hour sessions plus the break in between. If you are attending an extended session, for example B-C, this would replace your choices for both sessions B and C.

KEYNOTES

THURSDAY 7 DECEMBER 2017



CATHERINE ATTARD
- WESTERN SYDNEY
UNIVERSITY

**ENGAGEMENT AND
MATHEMATICS: WHAT IS IT,
AND WHAT DOES IT LOOK
LIKE?**



DAVID BUTLER –
UNIVERSITY OF ADELAIDE

**PLAYFUL AND
JOYFUL MATHS**

M MINDSETS

H HANDS-ON

In education we talk about student engagement every day, but what do we mean? What does real student engagement look like in a contemporary mathematics classroom? The term engagement relates to students' levels of interaction with classroom activities and content. However, educators often don't have a deep understanding of the elements required to ensure students experience true, sustained engagement, promoting lifelong learning and enhancing learning outcomes. The challenge to engage students of any age or ability and within any field of study is becoming increasingly complex. The nature of students and their learning needs continue to evolve as their social lives and studies intertwine due to the ubiquitous nature of technology. So how can mathematics educators engage these students? How should we effectively use technology in ways that enhance learning? How can we make mathematics learning more relevant and enjoyable for our students? I'll explore the construct of engagement and will discuss practical, hands-on ideas to enhance the teaching and learning of mathematics and increase student engagement.

Catherine is an Associate Professor in primary mathematics education and Distinguished Teaching Fellow at Western Sydney University. Her PhD research focused on engagement with mathematics and issues surrounding the teaching practices that influence students' engagement. Catherine's recent research has explored the effective use of mobile technologies to enhance the teaching and learning of mathematics. Catherine's passion is teaching. She has won national teaching awards, including a 2016 Australian Awards for University Teaching (AAUT) Teaching Excellence Award. She presents workshops and keynotes world wide, is a past President of the Mathematical Association of New South Wales and Secretary of the Mathematics Education Research Group of Australasia. Catherine has published teaching resource books as well as a mathematics board game, Mabble.

Keynote sponsored by:



I love maths. I derive great joy in finding the maths around me, talking about it, and solving problems I've never seen before. Yet I know not everyone experiences this kind of mathematical joy. Some find the concept of joy in maths a little alien. Some like maths but struggle to find joy in the maths they face daily. Some do have the joy but wonder how to help their friends, students and colleagues find it. I have come to realise that my own joy in maths has been created by a continual and concerted effort to play. I've organised more time to play with maths in my life, but also infused a playful attitude into the daily maths I do with students.

This session is about how to take a playful approach to your maths in order to find more joy. I'll talk about what both joy and play feel like and how they make a difference to growth mindset. I'll share my experiences running puzzle sessions and in providing maths learning support to thousands of students. You will get a chance to engage in some playful maths activities, and to find the play in maths that at first looks like hard work or like the 'same old thing'. I hope that you will learn some strategies to be more playful and hence find more mathematical joy.

Dr David Butler is the coordinator of the Maths Learning Centre (MLC) at the University of Adelaide. He helps hundreds of students every year to learn and love maths wherever they meet it. Before joining the MLC nine years ago, David completed a Bachelor of Mathematical Sciences with honours, a Graduate Diploma in Education, two years of teaching in high schools and a PhD in Finite Geometry.

David believes that it is not good enough to simply help people cope with the maths they are made to learn, but that maths should also be a joyful and empowering experience for all people.





**HAYLEY DUREAU - MT
WAVERLEY SECONDARY
COLLEGE**

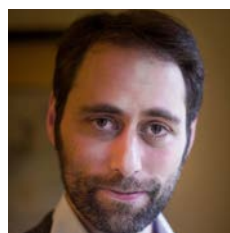
**MATHS BOOTCAMP AND
THE LESSONS I LEARNED**

**S SHIFTING THE
NARRATIVE**

If we want our students to believe that they can grow and improve, we'd better make it clear that we believe it too. This presentation will explore current research showing that excellence in teaching is one of the most powerful influences on student learning and achievement and will explore strategies for creating a culture of trust and encouraging students to see learning opportunities in mistakes, failure and challenge. You'll hear practical examples demonstrating how to focus on student growth and student voice, how to collect and use feedback, and how to use data to drive improvement. Hayley will share the story of the Maths Bootcamp program she developed for Year 12 students and how the program changed the way she teaches today. Improving student outcomes is not about working harder, but about shifting the narrative and looking at the evidence - powerful adult learning supports powerful student learning, and teacher efficacy promotes student efficacy.

Hayley Dureau is the Leading Teacher: Head of Student Voice at Mount Waverley Secondary College and has been recognised as a passionate and forward-thinking mathematics teacher and educational leader. Passionate about enhancing student learning by improving relationships between staff and students, Hayley introduced the 'Teach the Teacher' program, giving students the opportunity to provide professional learning for staff, drive elements the school's strategic plan, and design feedback tools which teachers use regularly, allowing students to provide feedback and discuss their learning with their teachers. Hayley regularly presents to mathematics teachers and is a National Texas Instruments Teacher Trainer.

Hayley's experience and achievement excellence has been recognised in numerous forums. In 2015 she won the VicSRC Teacher Advisor Award and in 2016 won the Victorian Department of Education Outstanding Secondary Teacher Award, allowing her to travel to the USA to undertake studies at the Harvard Graduate School of Education. Hayley was further recognised in 2017 with the International Specialised Skills, George Alexander Fellowship to undertake applied research in the area of science technology, engineering and mathematics teaching, and student voice in Denmark.



**DAN FINKEL - MATH FOR
LOVE**

**MAKING AND BREAKING
CONJECTURES**

T TARGETING

It can be fun to call our students mathematicians, but are we actually taking every opportunity for them to do what mathematicians do? Enter conjectures and counterexamples, at once key to the development and practice of mathematics, and simple enough for young children.

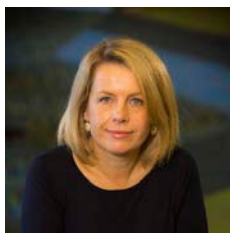
We'll unpack the process of making conjectures and breaking them with counterexamples, and see the shift in mathematical outlook and classroom culture that results when you use this process with students. We want to create classrooms that value rigorous mathematical thinking and argument, produce productive skepticism, help students own their understanding, and get everyone engaged in mathematics; I claim we can.

Dan Finkel is the Founder and Director of Operations of Math for Love, a Seattle-based organization devoted to transforming how math is taught and learned. A teacher of teachers and students, Dan works with schools, develops curriculum, leads teacher workshops, and gives talks on mathematics and education.

Dan is one of the creators of Prime Climb, the beautiful, colorful, mathematical board game, and of Tiny Polka Dot, the number-loving learning game for children. He is also co-architect of Seattle Public School's Summer Staircase math program, and hosts the annual Julia Robinson Math Festival in Seattle. You can see Dan's work, including his TEDx Talk 'Five Principles of Extraordinary Math Teaching,' at mathforlove.com.

Keynote sponsored by:





SARAH HOPKINS – MONASH UNIVERSITY

STRATEGY CHOICE IS KEY FOR BUILDING NUMBER FLUENCY: NEW APPROACHES FOR

TEACHING THE BASIC FACTS TO CHILDREN WHO ARE FALLING BEHIND

T TARGETING

Despite decades of research comparing groups of children with and without mathematics learning disabilities/difficulties (MLD), clear explanations of why children have difficulty with basic arithmetic are not forthcoming. On the other hand, when individual children are interviewed about the strategies they use and their errors are analysed, it becomes quite clear why their progress may be hindered. While there is much variety among children, sticking points include the use of inefficient counting strategies like counting-all, losing track while counting on, an overreliance on the min-counting strategy, faulty decomposition strategies, incorrectly memorised double facts, digit confusion, and guessing. Sarah will draw together findings from the literature and individual case studies of children, to suggest what teachers can do to target children's individual difficulties with developing basic number fluency. Practice is often associated with building mathematical fluency but what type of practice is needed? Three types of practice will be explored: problem-based practice, strategy-based practice and fact-based practice, and highlight common misunderstandings about the role of practice. If strategy choice is considered an essential element of all children's mathematical experiences then the question for the maths education community becomes, what approaches improve the efficiency with which problem-based practice leads to number fluency? This reframing of the problem opens up new and exciting opportunities for teaching the basic facts to children who are falling behind their peers. Suggested approaches will be outlined, including differentiated feedback, forming mental representations, and teaching with 'challenging' tasks.

Sarah is a senior lecturer in the Faculty of Education, Monash University and has years of experience in teacher education. Prior to this she was a secondary teacher of mathematics. She has a long-term interest in research that will help address Australia's 'long tail' of underachievement in mathematics. Sarah is investigating the role confidence plays in the development of retrieval-based strategies and how number fluency can be taught using cognitively-demanding tasks.



DAVE TOUT AND ROSS TURNER – ACER

TWO OLDISH CODGERS REFLECTING ON WHAT EXCELLENCE MEANS IN MATHS EDUCATION, WITH A FOCUS ON THE CRITICAL ROLE OF ASSESSMENT



Between them, Dave and Ross have about 90 years' experience in mathematics education and assessment across a range of sectors

and roles. This presentation will be an opportunity for two aging men to reminisce about the lessons they have learned over that period, and reflect on what they see as achieving excellence in maths education. Using assessment as the major focus, the presentation will start from their experiences, and the resulting lessons, or at least stories, in relation to all five of the conference themes:

- M MINDSETS**
- A ASSESSING**
- T TARGETING**
- H HANDS-ON**
- S SHIFTING THE NARRATIVE**

You can teach almost anybody almost anything. There are not 'maths people' and 'others'. Does typical teaching practice reflect these statements? Do our assessment practices reflect these statements?

Assessment is often seen as a dirty word. We know, our hands are filthy: PISA, PIAAC, VCE, VCAL and more.

Why do we see assessment and the collection of evidence as critical? Effective targeting of instruction depends on good information about where students are on a well-described learning path. Why are good 'learning progressions' important and why do all teachers need to know about them? And what role does assessment play? We would like these ideas to be more than buzz-phrases: real-world problem solving, modelling with mathematics, cooperative team work, mathematical communication, critical thinking. How on earth can we also do that with all our students?

Our journeys and narratives will reflect on how our own mindsets changed over our careers, and how we now jointly believe that excellence in maths education requires changed mindsets, hands-on learning, effective assessments, and properly targeted teaching and learning. And that combined, these can build the engaged and successful mathematics students of the future.

Keynote sponsored by:





DAVID CLARKE AND CARMEL MESITI – MELBOURNE UNIVERSITY

THE INTERNATIONAL LEXICON PROJECT: GIVING A NAME TO WHAT WE DO



M MINDSETS

Different communities, speaking different languages, employ different naming systems to describe the events, actions and interactions of the mathematics classroom. The

International Lexicon Project aims to identify the professional vocabularies available to middle school mathematics teachers in Australia, Chile, China, the Czech Republic, Finland, France, Germany, Japan and the USA to describe the events of the mathematics classroom. Local teams of researchers and experienced teachers in each country used a common set of classroom videos drawn from all participating countries to stimulate recognition of familiar terms describing aspects of the middle school mathematics classroom.

We'll report the characteristics, structure and distinctive features of the Australian Lexicon and illustrate these with specific examples along with contrasting examples from other lexicons. Consideration of other lexicons can provide insight into features of the mathematics classroom foregrounded or ignored by different communities. The Lexicon Project has the potential to enrich the professional vocabulary of all maths teachers. Australian teachers will gain access to sophisticated classroom practices named by teachers using languages other than English.

David is the Director of the International Centre for Classroom Research and is widely published. His research centres on capturing the complexity of classroom practice through a program of international video-based classroom research. Other significant research has addressed teacher professional learning, metacognition, problem-based learning, assessment, multi-theoretic research designs, cross-cultural analyses, curricular alignment, and the challenge of research synthesis in education. Carmel is Centre Coordinator of the ICCR. She is project manager of the Lexicon Project and a research member of the Australian team. Her research interests include lesson structure, lesson beginnings, mathematical tasks and the nature of differences in the pedagogical lexicons of education communities internationally. Carmel began her career as a secondary maths teacher and has held several leadership roles.



NORMAN DO – MONASH UNIVERSITY

HOW, WHAT AND WHY I THINK ABOUT MATHS

M MINDSETS

*When telling a typical person that I
Love maths and I do it for most of my days,
They usually ask questions like how, what and why,
Unless they ignore me, or worse, walk away!*

*Today, we will answer these questions and more,
Discuss some cool maths, see its beauty first hand,
And find out exactly what maths is good for,
While using examples you'll all understand.*

*Perceptions of maths are a crucial concern
That impacts what students feel they ought to do.
So join me for laughter but also to learn
Just how, what and why they should think of maths too!*

Norm is, first and foremost, a self-confessed maths geek! He is currently a Lecturer and ARC Research Fellow in the School of Mathematical Sciences at Monash University. He spends his time there playing with strange shapes, counting interesting objects, and wondering what might be true. (His three-year-old son probably does very much the same thing at kindergarten!)

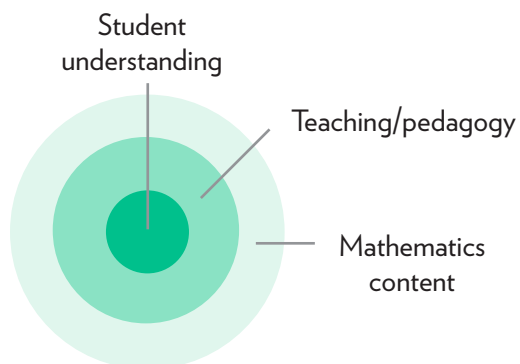
Norm is heavily involved in mathematics enrichment for school students, chairing the Australian Mathematical Olympiad Problems Committee and lecturing at the National Mathematics Summer School. His contributions in education have been recognised by a B. H. Neumann Award for 'significant contribution to the enrichment of mathematics learning in Australia' and an Australian Awards for University Teaching Citation for 'outstanding contributions to student learning'.



**SARAH FERGUSON -
CLAIRVAUX COLLEGE**

**TARGETING STUDENT
UNDERSTANDING**

T TARGETING



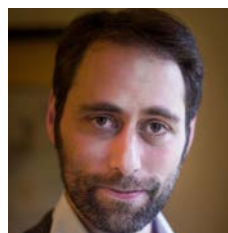
As teachers of mathematics we are aiming for the centre of our target which is student understanding of mathematics. To have learnt mathematics well is to have built understanding of the connections, the concepts and the relationships in mathematics that allow us to solve problems.

The middle ring is the teaching actions or pedagogy that we can draw on to create conditions for students to build understanding of key concepts. The outer ring is concerned with mathematics content – what are the big ideas and concepts that students need to build understanding in. Teaching is the mediating factor between the content and the students’ understanding. This keynote will examine pedagogy that builds student understanding of the key concepts in mathematics.

Sarah has been teaching in primary schools for about 15 years as a classroom teacher and in mathematics leadership roles. She completed her Masters in Early Numeracy in 2006 and her doctorate focusing on scaffolding and low attaining mathematics students in 2011.

Sarah teaches Prep three days a week and teaches pre-service teachers at ACU online.

She is currently the editor of MAV’s *Prime Number* magazine.



**DAN FINKEL - MATH FOR
LOVE**

PURE MATHEMATICS

H HANDS-ON

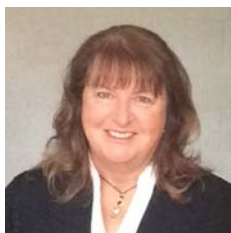
Students often get lost in the abstraction and technicalities of mathematics. Interestingly, we can remove technical barriers while making problems richer by introducing physical manipulatives into our classrooms, even as we study pure (i.e., unapplied) topics like fractions, proportion, algebra, and geometry.

We’ll see how deep and fascinating problems are waiting in simple materials and situations, and a surprising way we can help students connect mathematics to the world.

Dan Finkel is the Founder and Director of Operations of Math for Love, a Seattle-based organization devoted to transforming how math is taught and learned. A teacher of teachers and students, Dan works with schools, develops curriculum, leads teacher workshops, and gives talks on mathematics and education.

Dan is one of the creators of Prime Climb, the beautiful, colorful, mathematical board game, and of Tiny Polka Dot, the number-loving learning game for children. He is also co-architect of Seattle Public School’s Summer Staircase math program, and hosts the annual Julia Robinson Math Festival in Seattle. You can see Dan’s work, including his TEDx Talk ‘Five Principles of Extraordinary Math Teaching,’ at mathforlove.com.





TRISH JELBART AND NICOLE MERLICH – VICTORIA UNIVERSITY

SUCCESS IN TERTIARY EDUCATION REQUIRES MATHS!



S SHIFTING THE NARRATIVE

The perfect storm is upon Maths education! Universities, TAFEs and RTOs are competing for students and the mathematics required in courses is not clear, nor is maths listed as a pre-requisite for course entry. Many students are struggling with the Maths components of their tertiary and TAFE courses. In some courses, 50% of students cannot complete, fail or drop out because they do not have enough working maths skills. Such courses include nursing, paramedics, science, business, sports and exercise science, psychology, engineering, electrical and building trades, etc. This presentation will outline the maths that students require and discuss how students can be assisted in TAFE and University.

Trish Jelbart is currently a Mathematics Education Developer at Victoria University, working with lecturers to make the maths in various courses more accessible for students, using various strategies and technologies and improving students' mindset toward maths. She also teaches basic mathematics in a preparatory course for nurses and paramedics. Previously, Trish taught in primary and secondary schools.

Nicole is an Academic Support Lecturer at Victoria University, working with first year business and engineering students and staff. Previously, Nicole worked with TAFE students in various trades, where often the students were technically able, but the mathematical requirements of their course presented a significant mindset barrier. Nicole assists students to improve their understanding of mathematical concepts via various face-to-face support sessions and online materials.

Cathy Bushell currently teaches senior mathematics at Mount Joseph Girls' College, Altona. Cathy also worked in learning support at Victoria University for fourteen years, providing academic support to TAFE students. She worked extensively with students from trade, engineering and nursing courses to develop their maths skills that were essential for satisfactory completion of their courses.



AMY MACDONALD – CHARLES STURT UNIVERSITY

ASSESSING YOUNG CHILDREN'S MATHEMATICAL STRENGTHS

A ASSESSING

This presentation explores a range of research-based and practically-relevant approaches for recognising, and building upon, young children's mathematical experiences and understandings. Based on a mantra of 'knowing where children are going to by knowing where they are coming from', Amy will examine a variety of strategies that can offer holistic insights into what children know and can do in mathematics. There is growing recognition that children develop powerful mathematical ideas from a very young age. The increasing numbers of children participating in early childhood programs, and the emphasis on the importance of mathematics in general, provide compelling reasons for understanding children's mathematical development in the early childhood years. In order to make children's competencies visible, we need to utilise assessment strategies that attend to young children's capacities for sharing their unique mathematical experiences and understandings. Amy will explore questions of why and how to assess young children's mathematical strengths, and will canvass research to inform best-practice approaches. Given the compelling international evidence of the relationship between mathematical knowledge at the time of school entry and later school achievement, it is important to consider the mathematical competencies of children in the early years in order to understand the foundation upon which subsequent mathematics education should build.

Dr Amy MacDonald is a Senior Lecturer in Early Childhood Mathematics Education at Charles Sturt University, Albury-Wodonga. Her research focuses on the mathematics experiences and education of children in Birth to Five Education settings, and the mathematics professional learning of the educators who work with these young children. Amy coordinates the early childhood mathematics education subjects in CSU's Birth to Five degree program, and in 2014 was awarded an Australian Government Office for Learning and Teaching 'Citation for Outstanding Contributions to Student Learning' for her approaches to mathematics education.

GENERAL INFORMATION

CONFERENCE VENUE

La Trobe University, Kingsbury Drive, Bundoora, Victoria.

CAR PARKING

All conference delegates need to pay for parking. Please download the app before the conference.



The image shows a sign for La Trobe University Car Parking. At the top left is the La Trobe University logo, featuring a stylized eagle and the text 'LA TROBE UNIVERSITY'. Below the logo is a large red circle containing a white silhouette of a car. Underneath the circle is a red rectangular box with the words 'CAR PARKING' in white, bold, uppercase letters. Below this box, there is text explaining the parking system: 'La Trobe University uses Pay-as-you-go (PAYG) parking so you pay only for the time you use. Payment can be made via app, phone or online. For more information, please visit latrobe.edu.au/transport-central'. On the right side of the sign, there is vertical text: 'ICON 9609 CRICOS Provider 00151W'.

MORNING TEA

Morning tea on both days will be provided in the exhibition hall on both days.

NETWORKING DRINKS

Networking drinks will be held on Thursday 7 December, 4.40pm - 5.50pm in the exhibition hall, Union Building

Networking drinks is free of charge and open to all registered delegates and exhibitors.

CONFERENCE OFFICE CONTACT

Jacqui Diamond – Events Manager

Phone: + 61 3 9380 2399

Mobile: 0422 849 950

Email: jdiamond@mav.vic.edu.au

www.mav.vic.edu.au/conference.html

CANCELLATION POLICY

Participants who cancel their booking on or prior to Monday 6 November 2017 will receive a refund less a \$30 administration fee. All cancellations **must** be in writing and include any documentation already sent out. **No refunds** are available after the Monday 6 November 2017. Registration may be transferred to another person.

REGISTRATION INFORMATION

Registration fees

Member Metro: one day	\$284
Member Metro: two days	\$567
Member Non-Metro: one day	\$275
Member Non-Metro: two days	\$559
Non Member: one day	\$371
Non Member: two days	\$742
Student: one day	\$146
Student: two days	\$293

Networking drinks (Thursday 7 December), morning tea and lunch are included in the prices above. All prices include GST.

Before you register you will need:

1. Your username and password to register online, if unsure ring the MAV office on +61 3 9380 2399.
2. School purchase order number or credit card for payment (only Visa and MasterCard are accepted).
3. Contact at school (Business Manager) to approve your registration.
4. List of the sessions you want to attend.

To register

1. Visit <http://registration.mav.vic.edu.au/Reg/>
2. Log in using your username (email) and password. If logged in correctly it will display your name.
3. Click on the box that has the MAV17 Conference - choose your sessions, accommodation (if applicable), etc, then click confirm.
4. Check the summary and amount you have been charged - if you think you are a member but have been charged as a non-member call the MAV office on 61 3 9380 2399.
5. Click on either purchase order or pay online.

ACCOMMODATION

6. Put in the name, position and email address of a person of authority to sign off on your registration.
7. Click submit to complete your registration.
8. Print out a copy of your confirmation for your records.
9. You'll receive an automatic email confirming your registration.

If you do not receive this email within 24 hours your registration has not been completed.

Note: After you have registered you may login at any time using your login details to change your sessions or to re-print your confirmation. You cannot change any item that affects the amount transacted and these changes will have to be made by the MAV office.

Inclusions

The registration fee includes (per person) - morning tea and lunch for each day registered; attendance at selected sessions; Networking drinks on Thursday 7 December; and access to industry exhibition.

Notes

Registrations will **not** be processed without full payment or a school purchase order number.

Session numbers are limited and the website will indicate when sessions are full.

Member rates apply to individual members, institutional/school members, Australian Mathematics Associations who are members of AAMT and New Zealand Mathematics educators who are members of the NZAMT.

The MAV reserves the right to cancel presentations if minimum numbers are not reached.

**APPLICATIONS CLOSE
MONDAY 6 NOVEMBER 2017 AT 5PM**

MANTRA HOTEL, PRESTON

Located a short 10 minute drive from La Trobe University, this is a four star hotel. A shuttle bus will operate between Mantra and La Trobe University on Thursday and Friday of the conference. The below prices do not include breakfast.

OPTION 1: STUDENT ROOMS

These rooms consist of a single bed 190cm long x 94cm wide and offer a work station with high speed internet, Foxtel, tea and coffee making facilities, small bathroom with shower over toilet and self-controlled air conditioning.

\$90 per room/per night

OPTION 2: BREAKFREE QUEEN OR TWIN

Featuring floor to ceiling glass, these rooms consist of either two single beds or one queen bed and offer a work station with high speed internet, Foxtel, tea and coffee making facilities, wet bathroom style ensuite and self-controlled air conditioning.

\$135 per room/per night

OPTION 3: ONE BED MANHATTAN ROOM

Simply stunning one bed Manhattan offers one queen bed, self-contained kitchenette including stove top, microwave, fridge, lounge and dining. All rooms feature work station, high speed internet, Foxtel, self-controlled reverse cycle air conditioning/heating, minibar, LCD TV and in room safe.

\$204 per room/per night

OPTION 4: TWO BED MANHATTAN ROOM

As per the one bed Manhattan but with two queen beds.

\$235 per room/per night

LA TROBE UNIVERSITY

STUDENT ROOMS

Glenn and Menzies Colleges are located on campus at La Trobe University. These are student rooms used during the year, so are not spacious. Please note also that there are a number of other patrons staying at the college at the same time so there may be some noise during your stay.

These rooms consist of one single bed. Bathrooms are shared with one bathroom for every four rooms.

You will need to bring your own toiletries and soap. The price does not include breakfast.

\$60 per room/Per night

All rooms are subject to availability. We have placed a limited hold on rooms so book early.

SHUTTLE BUS

During the conference a shuttle will run from Mantra Bell City to La Trobe University. This shuttle service is run by Murrays Coaches.

Departure Point at Mantra – Corner of Hotham Street and Bell Street (in Hotham Street).

Drop off and pick up point at La Trobe University – Bottom of Moat Drive at bus shelter

Thursday 7 December

Departure Mantra Bell City to La Trobe Uni bus shelter, Moat Drive: 7.45am, 8.15am, 8.45am, 9.15am

Departure La Trobe Uni bus shelter, Moat Drive Mantra Bell City: 5pm, 5.45pm, 6.50pm

Friday 8 December

Departure Mantra Bell City to La Trobe Uni bus shelter, Moat Drive: 7.45am 8.15am, 8.45am, 9.15am

Departure La Trobe Uni Bus Shelter to Moat Drive Mantra Bell City: 5.00pm, 5.45pm

Note: actual times will be confirmed closer to the conference.

SCHOOL EDUCATION PROGRAM



LOVE
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An initiative by
Victorian
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This free program supports your secondary school community to help students develop healthy and informed attitudes to gambling.

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- useful resources for parents.

lovethethegame.vic.gov.au

A number of food outlets at La Trobe University will be serving lunch to conference delegates. You will receive a lunch voucher with confirmation of your registration. This will entitle you to a "MAV17 Conference Package Lunch" at the following campus outlets:

- ◇ Pings Café Moat
- ◇ Bachelor of Coffee
- ◇ Café Spice
- ◇ Café Veloci
- ◇ Caffeine
- ◇ Fuel Juice
- ◇ Fusion Pizza
- ◇ Grain Express
- ◇ Grafali's Coffee Roasters
- ◇ Mamak Rice & Noodle
- ◇ Vitality
- ◇ Writers Bloc

When filling in your registration form online you MUST select which outlet you want to get lunch from for each day you are attending. If nothing has been selected your default will be Ping's Café Moat.

Pings Café Moat

Thursday

1. Hot Lunch Box - Lemon Chicken OR Stir fried mixed vegetables with steamed rice
 2. Cold Lunch Box – Roast Chicken & Salad roll, vegetarian sushi, piece of fruit
- PLUS Bottle of drink

Friday

1. Hot Lunch Box - Rainbow Steak OR Stir fried mixed vegetables with steamed rice
 2. Cold Lunch Box - Teriyaki Chicken & Salad roll, vegetarian sushi, piece of fruit
- PLUS Bottle of drink

Bachelor of Coffee

Ciabatta or Falafel and salad wrap
PLUS: Drink, dessert/treat
Available – Vegetarian

Café Spice

Large serve of 2 curries and rice
PLUS 1 serve Indian sweet dessert (Gulab Jamun), can of drink
Available – Gluten free, nut free, halal, vegan

Café Veloci

Main Meal
PLUS 1 piece of fresh fruit, cold drink, chocolate treat
Available – Gluten free, vegetarian, vegan, dairy free, nut free

Caffeine

Baguette OR Wrap OR Vietnamese rice paper rolls or Sushi OR brown rice salad (Thursday), Quinoa Salad (Friday)
PLUS Drink and fruit OR sweet treat
Available – Vegetarian

Fuel Juice

1 x Large Salad OR Wholemeal wrap
PLUS: Bottle of water OR small juice, piece of fresh fruit OR small fruit salad, yogurt with muesli and topping OR healthy bar

Fusion Pizza

2 slides of pizza & potato cake OR Hamburger OR 2 pieces of chicken drumstick OR Lasagne OR Fried rice and a chicken drumstick
PLUS: Soft drink, piece of fruit

Grain Express

1 x Large Meal
PLUS Bottle of drink
Available – Vegetarian, gluten free

Grafali's Coffee Roasters

1x lunch option
PLUS drink and piece of fruit

Mamak Rice & Noodle

Rice or noodle dish
PLUS Can of drink
Available – Vegetarian

Vitality

1 x Roll of your choice
PLUS Drink, piece of fruit
Available - Vegetarian

Writers Block Café

1 x box sandwich
PLUS Bottle of water, sweet treat
Available – Vegetarian, vegan, gluten free



The background features a complex, abstract geometric pattern of blue and white lines. The pattern consists of multiple concentric, slightly offset rectangular and zigzag shapes that create a sense of depth and movement. A large, solid white circle is centered in the composition, serving as a backdrop for the text.

**SESSION
SUMMARY:
THURSDAY
7 DECEMBER**

SESSION SUMMARY: THURSDAY

THURSDAY 7 DECEMBER 2017

SESSION A: KEYNOTE, 9AM-10AM

A1	Primary-middle years	Engagement and mathematics: What is it, and what does it look like? <i>Catherine Attard</i>
A2	All levels	Playful and joyful maths <i>David Butler</i>
A3	All levels	Making and breaking conjectures <i>Dan Finkel</i>
A4	Secondary	Maths bootcamp and the lessons I learned... <i>Hayley Dureau</i>
A5	Y2-8	Strategy choice is key for building number fluency: New approaches for teaching the basic facts to children who are falling behind <i>Sarah Hopkins</i>
A6	All levels	Two oldish codgers reflecting on what excellence means in maths education, with a focus on the critical role of assessment <i>Dave Tout, Ross Turner</i>

For a full description of keynotes, see page 5.

SESSION B: 11AM-12PM

B1	F	Big ideas for young minds <i>Brian Doig</i>
B2	F - 10	The mathematical world of Indigenous Australians <i>Andrew Crisp</i>
B3	F - 12, VCAL	Improving students' outcomes through the use of assessment diagnostics <i>Alexander Young</i>
B4	F - 2	Mathematical investigations in the early years <i>Ben Kelso, Alex Berry</i>
B5	F - 6	Tip of the iceberg - how to find the best rich tasks for your teaching context <i>Jennifer Bowden, Nadia Walker</i>
B6	F - 6	It's called number AND ALGEBRA: algebraic thinking across primary years <i>Tim Colman</i>

B7	F - 6	Embedding the proficiencies in the primary years <i>Cathy Davidson, Jan Morahan, Jayde Clayton</i>
B8	F - 6	How to use concept cartoons to address common student misconceptions <i>Angela Rogers, Bern Long</i>
B10	Y1 - 6	One task for all - an inclusive teaching approach that encourages growth mindsets <i>Russell McCartney, Chris Terlich, Sean Webb</i>
B12	Y10 - 11	'One off' activities <i>Sue Scott, Leah Whiffin</i>
B13	Y11 - 12	The Bisection Method and Newton's Method <i>Brian Stokes</i>
B14	Y11 - 12	VCAL responsible gambling Victoria units <i>James Gray</i>
B15	Y12	2016 Math Methods examinations <i>Allason McNamara, Mary Papp</i>
B16	Y12	Let's crack open a Year 12 SAC: A look into a Maths Methods application task! <i>Trang Pham, David Symington</i>
B17	Y2 - 4	Choosing tasks to foster mathematical reasoning <i>Sandra Herbert, Anita Carey</i>
B18	Y2 - 6	Helping students understand division <i>Michael Bairstow</i>
B19	Y2 - 8	Learning fractions with picture puzzles <i>Doug Williams</i>
B20	Y3 - 12, VCAL	Free online maths resource, supported by Westpac <i>Chris Velis, Megan Blanch</i>

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The classroom solution that converts curiosity into understanding.



 TEXAS INSTRUMENTS

SESSION SUMMARY: THURSDAY (cont.)

B22	Y4 - 8	Differentiation without technology: using enrichment problems for stages 3 and 4 <i>Anne Prescott, Pauline Kohlhoff</i>
B23	Y5 - 10	3D printing in the classroom and on a budget <i>Ben Dennis, Liam O'Connor</i>
B24	Y5 - 10	Using teamwork to motivate students <i>Joe Wright, Joanna Tutos, Paul Wright</i>
B25	Y5 - 10	Mathematical reasoning - forging a path to excellence <i>Dianne Siemon</i>
B26	Y5 - 12	Using technology to provide quality feedback <i>Thomas Moore</i>
B27	Y6 - 9	Jumping frogs and algebra <i>Ian Bull</i>
B28	Y7 - 10	Mathematics programs which provide for high potential mathematics students <i>Simone Zmood</i>
B29	Y7 - 12	STEM in a box <i>Rodney Anderson and Brian Lannen</i>
B32	Y7 - 12	Shining up the staples-delving into evidence informed classroom practices <i>Ollie Lovell, Wendy Taylor</i>
B33	Y7 - 12	Writing instructional material for mathematics <i>Neale Woods</i>
B34	Y7 - 12	Proofs, patterns and geometry - a new Year 10 mathematics option at Camberwell High School <i>Geoffrey Menon, Ursula Parker</i>
B35	Y7 - 12	From the Banda-copier to the iPad: <i>Roland Bairstow</i>

B36	Y7 - 12	Feedback: listen and learn <i>Hayley Dureau</i>
B37	Y7 - 12	Critical and creative thinking in the maths classroom <i>Karen McMullen</i>
B40	Y9 - 10	From little squares, big quadratics grow <i>Alastair Lupton</i>
B41	Y9 - 12	Encryption using Python (applied probability) <i>Sanjin Dedic, Nat Bradshaw</i>
B42	Y10	The integration of mathematics and everyday knowledge: Year 10 mathematics and mathematical literacy learners' solution strategies <i>France Machaba</i>
B43	Y7 - 12, VCAL	ADUSU ALGEBRA™ <i>Ruth Adusu</i>

SESSION B-C: 11AM-1.20PM

B-C1	F - 12	Individualised learning without the headaches. Using Maths Pathway <i>Paul Rowland</i>
B-C2	F - 6	Fun and games - engaging students in mathematics through games <i>Peggy Ashton and Jennifer Vincent</i>
B-C3	F - 7	STEM in the Victorian Curriculum <i>Britt Gow and Emma Castelow</i>
B-C4	Y1 - 12, VCAL	3 act real world problem solving - include, engage and empower your students <i>Craig Becker</i>
B-C5	Y11 - 12	SAC's for Mathematical Methods courses (application tasks) <i>Sanjeev Meston and Ryan Tebble</i>
B-C6	Y5 - 9	Warm-ups and tuning-in <i>Lynne Laursen and Anjana Dwivedi</i>
B-C7	Y6 - 10	Teaching with algebra tiles <i>Michael O'Reilly and Norrian Rundle</i>

SESSION SUMMARY: THURSDAY (cont.)

B-C8	Y7 - 10	Algorithms and coding in Years 7-10 using TI-Nspire <i>Frank Moya</i>
B-C9	Y7 - 9	Targeted teaching in secondary mathematics - algebra <i>Nancy Surace and Ainslie McIntosh</i>
B-C10	Y9 - 10	Coding tasks for middle school mathematics <i>David Tynan</i>
B-C11	Y9 - 10	Middle school mathematics taken off the beaten path <i>Luke Bohni and Jennifer Palisse</i>

SESSION C: 12.10PM-1.10PM

C1	F - 12	STEM professionals in schools - bringing real world mathematics into the classroom <i>Kate Maiden</i>
C2	F - 12, VCAL	Seeing maths <i>Vicky Kennard</i>
C4	F - 4	The importance of developing children's counting skills: the move from rote to rational counting <i>Catherine Pearn</i>
C5	F - 6	Using rich narratives to engage students in mathematics <i>James Russo and Toby Russo</i>
C6	F - 6	'...so form becomes feeling.' - the mathematics of block play <i>Cameron Lee</i>
C7	F - 6	Exploring addition and subtraction through mental computation <i>Catherine Epstein</i>
C8	F - 6	Let's get started! Using games to promote fluency and reasoning <i>Ellen Corovic</i>
C9	F - 6	Lessons and tasks that encourage mathematical inquiry: reSolve Project <i>Nadia Walker</i>
C10	K - 2	Working mathematically with infants <i>Doug Williams</i>

C11	Y1 - 6	One task for all - an inclusive teaching approach that encourages growth mindsets <i>Russell McCartney, Chris Terlich, Sean Webb</i>
C12	Y1 - 8	Making mathematics teaching exciting <i>Charlotte Wilkinson and Sherryl Gomm</i>
C13	Y10 - 11	'One off' activities <i>Sue Scott and Leah Whiffin</i>
C14	Y10 - 12	ClassPad excellence for upper school students <i>Charlie Watson</i>
C15	Y11 - 12	Formative assessment using Desmos in mathematical methods <i>Bryn Humberstone and Sarah Bortolotto</i>
C17	Y12	2016 Specialist Mathematics examinations <i>Allason McNamara, Philip Swedosh and Dean Lamson</i>
C18	Y12	Teaching algorithmic thinking - VCE Algorithmics (HESS) <i>Georgia Gouros</i>
C19	Y3 - 10	Engaging students in applied maths that deals with real life using real data <i>Richard Korbosky</i>
C21	Y3 - 6	What the PONT? A targeted teaching tale <i>Ben Allen and Chantelle Polkinghorne</i>
C22	Y3 - 8	Developing algorithmic thinking in the primary and junior secondary years <i>Max Stephens</i>
C23	Y5 - 10	The dog ate my homework <i>Joe Wright, Joanna Tutos and Paul Wright</i>
C24	Y5 - 10	Algebra - the story continues <i>Mike Clapper</i>
C25	Y5 - 12	Strategies for differentiation in the mathematics classroom <i>Thomas Moore</i>
C26	Y5 - 11	Hanlon's handy hints <i>Stephen Hanlon</i>

C27	Y7 - 12	Essential Maths, Cambridge Senior Maths and ICE-EM – a guide to Cambridge’s online resources powered by HOTmaths <i>VJ Gunawardana</i>
C29	Y5 - 9	Fixed vs growth mindsets: students approaches to learning in mathematics <i>Kristin Humphreys and Tracey Rogers</i>
C30	Y5 - 9	Thinking outside the strand <i>Helen Booth</i>
C32	Y7 - 10	Are you struggling to engage middle school students in the maths classroom? <i>Adam Kruger and Scott Rumble</i>
C33	Y7 - 12	What were you thinking? <i>Dietmar Schaffner and Zoe Schaffner</i>
C34	Y7 - 12	7 things I wish I had known 25 years ago <i>Peter Collins</i>
C35	Y7 - 12, VCAL	Problem solving in ancient China <i>Terence Mills</i>
C36	Y7 - 12, VCAL	Using Wolfram tools in the Victorian Classroom <i>Craig Bauling</i>
C37	Y7 - 12	Mathematica, an introduction and more <i>Ian Willson</i>
C38	Y4 - 12, VCAL	Using your Adobe apps to enhance STEM <i>Tim Kitchen</i>

SESSION D: 2.30PM-3.30PM

D1	F - 1	Prepping for Foundation: the best start – transitioning students from Kinder to Foundation <i>Bree Collins</i>
D2	F - 10	Essential Assessment - assessment and curriculum made easy <i>Andrew Spitty</i>
D3	F - 10	Mathletics - what’s new? <i>Lauren Anderson and Tom Beardsworth</i>

D4	F - 10	Mindset: Where is your head at? <i>Christopher Daxecker and Stephanie Black</i>
D5	F - 12	Training teachers in East Africa <i>Jenny Clark</i>
D6	F - 12, VCAL	MAV student activities – enhancing problem solving and inquiry <i>Jennifer Bowden and Helen Haralambous</i>
D7	F - 4	The teacher as learner: favourite tasks and key learnings <i>Jill Brown, Mel O’Reilly and Laura Sansonetti</i>
D8	F - 4	Making data and statistics matter <i>Rachel Azzopardi</i>
D9	F - 6	Problem solving and the proficiencies at Wedge Park Primary School <i>Sara McKee and Melissa Lake</i>
D10	F - 8	Handling hands on <i>Jacinta Blencowe</i>
D11	F - Adult	Don’t get caught up in alternative facts. How you can be more efficient and have greater impact when analysing student data <i>Kathryn Sobey and Michaela Epstein</i>
D12	Y7 - 12	Desmos: graphing and animations <i>Roger Walter</i>
D13	Y1 - 10	Maths card games that make you think <i>Richard Korbosky</i>
D14	Y1 - 6	Playful exploration to deep questions <i>Dan Finkel</i>
D15	Y1 - 8	Using the Bar Model method to solve multi-step word problems <i>Lei Bao</i>
D16	Y10 - 12	Excelling with eActivities for ClassPad in the upper school <i>Charlie Watson</i>
D17	Y10 - 12, VCAL	VCAL numeracy meets Edison Robots <i>Kath O’Shea</i>
D18	Y10, VCAL	A project-based approach to teaching maths for upper-secondary students with special learning needs <i>Celeste Pryke</i>

SESSION SUMMARY: THURSDAY (cont.)

D19	Y11 - 12	MAV VCAL hands-on resources <i>James Gray</i>
D20	Y11 - 12	Teaching VCE Mathematical Methods for the first time -some tips and tricks <i>Mary Papp</i>
D21	Y2 - 12	Intentional fun: enjoying maths for ALL it's worth <i>Andrew Lorimer-Derham</i>
D22	Y2 - 7	Mathematics and the Commonwealth Games <i>Pamela Hammond</i>
D23	Y3 - 10	What does excellence in MATHS look like? It is all about relationships and communication <i>Michael O'Connor</i>
D24	Y3 - 10	Automatic recall of basic number facts <i>Johanna Crisp and Kerri Goode</i>
D25	Y3 - 6	Assessing mathematical reasoning <i>Sandra Herbert and Colleen Vale</i>
D27	Y4 - 10	The mathematics of magic <i>Greg Carroll</i>
D28	Y4 - 6	Lessons in financial literacy <i>Carly Sawatzki</i>
D29	Y4 - 7	My top 5 success secrets of Ancient China and India for maths teachers today <i>Jonathan Crabtree</i>
D30	Y4 - 8	Developing good questions to reveal and guide fractional thinking <i>Catherine Pearn, Max Stephens and Robyn Pierce</i>
D31	Y4 - 9	Creative geometry learning: A research study of investigations with the MATHOMAT template <i>John Lawton</i>
D32	Y5 - 10	Is perfect differentiation impossible? These teachers found a way AND saved marking/prep time <i>Luke D'Astoli</i>
D33	Y5 - 12	Engaging hooks <i>Thomas Moore</i>

D34	Y7 - 12	Essential Maths, Cambridge Senior Maths and ICE-EM – a guide to Cambridge's online resources powered by HOTmaths <i>VJ Gunawardana</i>
D36	Y5 - 8	How deep is your garden bed? <i>Doug Williams</i>
D37	Y6 - 9	Jumping frogs and algebra <i>Ian Bull</i>
D38	Y7 - 10	Small changes towards a bigger impact <i>Vanessa Rule-Paddle and Antje Leigh-Lancaster</i>
D39	Y7 - 12	STEM: Women are (still) all over it <i>Katherine Seaton</i>
D40	Y7 - 12	The secrets hidden in Pascal's Triangle <i>Nadia Abdelal</i>
D41	Y7 - 12	Scattered plots: How statisticians think about data using graphs <i>David Butler</i>
D43	VCAL	A tropical logo – exploring the Volivoli Fish with TI-Nspire CAS <i>Roger Wander</i>
D44	Y7 - 8	SURVIVORing Year 7 mathematics <i>Ann Kilpatrick</i>
D45	Y7 - 9	Was that set for homework? <i>Wendy Taylor, George Tissera and Sabine Partington</i>
D46	Y8 - 11	Humans controlling machines <i>Anthony Harradine</i>
D47	Y3 - 6	Communicating reasoning with digital technology <i>Esther Loong and Emma Fawcett</i>
D48	Y6 - 12, VCAL	Cloud-based planning, tracking and reporting for easy differentiation in today's classrooms <i>Bill Murray and Victoria Pichler</i>

SESSION D-E: 2.30PM-4.40PM

D-E1	Y9 - 10	Coding tasks for middle school mathematics <i>David Tynan</i>
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SESSION E: 3.40PM-4.40PM

E1	F - 1	Prepping for Foundation: the best start – transitioning students from Kinder to Foundation <i>Bree Collins</i>
E2	F - 10	Maths in the mulch: real-life learning through a kitchen garden program <i>Rebecca Naylor and Stephanie Davies</i>
E3	F - 12	Give probability a chance <i>Doug Williams</i>
E4	F - 12	MAV-Maths Talent Quest (MTQ) <i>June Penney and Jenny Dockeary</i>
E5	F - 12, VCAL	Improving students' outcomes through the use of assessment diagnostics <i>Alexander Young</i>
E6	F - 6	The essential elements of lessons that include all students in building understanding, solving problems and reasoning mathematically <i>Peter Sullivan</i>
E7	F - 6	It's called number AND ALGEBRA: algorithmic thinking across primary years <i>Tim Colman</i>
E8	F - 6	Eliciting student mathematical reasoning <i>Wanty Widjaja and Jennifer Churcher</i>
E9	F - 6	Getting creative with maths and growth mindsets <i>Rebecca Harris</i>
E10	F - 9	Incorporating the proficiencies - focussing on BIG IDEAS <i>Dianne Siemon</i>
E11	F - 9	Mathematics is a fun activity with folding paper <i>Karim Noura</i>
E12	Y11 - 12	MAV VCAL book resources <i>James Gray</i>

E13	Y10 - 12	Worthwhile CAS calculator use in this year's second Methods exam? <i>Kevin McMenamin</i>
E14	Y10 - 12	ClassPad excellence for upper school students <i>Charlie Watson</i>
E15	Y11 - 12	Teaching sampling and inference using data cards <i>Shane Dye and Nicola Petty</i>
E16	Y2 - 12	Helping students navigate the labyrinth of mathematical symbols <i>Kin Eng Chin and Caroline Bardini</i>
E17	Y2 - 7	Mathematics and the Commonwealth Games <i>Pamela Hammond</i>
E18	Y3 - 10	What does excellence in MATHS look like? It is all about relationships and communication <i>Michael O'Connor</i>
E19	Y3 - 12	Promoting long-term learning progress and the ACER Certificates <i>Karen Sturzaker</i>
E20	Y3 - 12, VCAL	How do I...? A Q&A with the Mathspace team Joe Wilson and Paul Fielding
E21	Y3 - 6	What the PONT? A targeted teaching tale <i>Ben Allen and Chantelle Polkinghorne</i>
E22	Y4 - 10	Number genetics <i>Mike Clapper</i>
E23	Y4 - 10, VCAL	A numeracy intervention program achieving outstanding growth <i>Michelle Anderson and Helen Barker</i>
E24	Y4 - 6	Lessons in financial literacy <i>Carly Sawatzki</i>
E25	Y5 - 12, VCAL	Forming hypothesis – data collections and using online free Google Apps <i>Iqbal Hossain and Fahmida Hossain</i>
E26	Y5 - 8	Simple solar instruments <i>Tim Byrne</i>
E27	Y7	Integrating algorithms and coding into the mathematics classroom <i>Chris Paragreen and Bernie McGrath</i>
E28	Y7 - 10	Scratch mathematics (make your own CAS Calculator) <i>Sanjin Dedic</i>

SESSION SUMMARY: THURSDAY (cont.)

E29	Y7 - 10	The big data classroom: scanning the world <i>Eugene Roizman</i>
E30	Y7 - 10	Promoting and assessing creativity and critical thinking <i>Geetha James</i>
E31	Y7 - 10	Algorithmic thinking and programming with Python <i>Nat Bradshaw</i>
E32	Y7 - 10	Solution based resources – the problem with problems <i>Caitlin Mahony</i>
E33	Y7 - 10	Coding and STEM with Pearson Mathematics 2nd Edition <i>Tim Carruthers, Julian Lumb and Daniel Hernandez</i>
E34	Y7 - 10	Mathematica for the Victorian Curriculum <i>David Leigh-Lancaster</i>
E35	Y7 - 12	7 things I wish I had known 25 years ago <i>Peter Collins</i>
E36	Y7 - 12	All tangled up <i>Amie Albrecht</i>

E37	Y7 - 12	CASIO education resources – a guided tour <i>Alastair Lupton</i>
E38	Y9 - 11	Harry Houdini and maths <i>Chris Ireson</i>
E41	Y5 - 8	Modelling motion: putting mathematics into middle years STEM activities <i>Susie Groves and Brian Doig</i>
E42	F - 6	Numeracy picture book libraries with linked lessons <i>Anna Kapnoullas</i>
E43	Y5 - 8	Maths games for Maths Games Days <i>Helen Haralambous</i>
E44	All levels	Using challenging and consolidating tasks to improve mathematical fluency <i>Sarah Hopkins and James Russo</i>

The background features a complex, abstract geometric pattern of blue and white lines. The pattern consists of multiple concentric, slightly offset lines that create a sense of depth and movement, forming a circular frame around the central text. The lines are of varying thickness and are arranged in a way that suggests a three-dimensional, crystalline structure.

**SESSION
SUMMARY:
FRIDAY
8 DECEMBER**

SESSION SUMMARY FRIDAY

FRIDAY 8 DECEMBER 2017

SESSION F: KEYNOTE, 9AM-10AM

F1	Primary	Targeting student understanding <i>Sarah Ferguson</i>
F2	Secondary	The International Lexicon Project: Giving a name to what we do <i>David Clarke and Carmel Mesti</i>
F3	All levels	How, what and why I think about maths <i>Norman Do</i>
F4	All levels	Pure mathematics <i>Dan Finkel</i>
F5	All levels	Success in tertiary education requires maths! <i>Trish Jelbart and Nicole Merlich</i>
F6	Early years	Assessing young children's mathematical strengths <i>Amy MacDonald</i>

For a full description of keynotes, see page 8.

SESSION G: 11AM-12PM

G1	F	Big ideas for young minds <i>Brian Doig</i>
G2	F - 10	The mathematical world of Indigenous Australians <i>Andrew Crisp</i>
G3	F - 10	Mathletics - what's new? <i>Lauren Anderson and Tom Beardsworth</i>
G4	F - 12, VCAL	Linking part-part-whole knowledge with multiplicative strategies <i>Dheepika Rathana Kumar</i>
G5	F - 6	Tip of the iceberg - how to find the best rich tasks for your teaching context <i>Jennifer Bowden and Nadia Walker</i>
G6	F - 6	From closed to open - differentiated investigations allowing students to become proficient mathematical learners <i>Brendan Hodge, Karyn Thomas and Kristy Miller</i>

G8	F - 6	Eliciting student mathematical reasoning <i>Wanty Widjaja and Jennifer Churcher</i>
G9	F - 7	What is it really like in a Finnish school? <i>Trish Jelbart</i>
G10	F - Adult	Why choose maths? <i>Janine McIntosh</i>
G12	Y10 - 12	Excelling with eActivities for ClassPad in the upper school <i>Charlie Watson</i>
G13	Y10 - 12	Further Maths examinations 1 and 2: advantageous use of the CAS calculator <i>Kevin McMenamin</i>
G14	Y11 - 12	The Bisection Method and Newton's Method <i>Brian Stokes</i>
G15	Y2 - 10	Get your hands on hands-on tasks <i>Doug Williams</i>
G18	Y2 - 6	Exploring depth. What if???? <i>Catherine Epstein</i>
G19	Y2 - 8	Mind your language! Teaching mathematical vocabulary so it sticks <i>Andrew Lorimer-Derham</i>

G22	Y4 - 12	Using formative feedback – make it useful, make it quick! <i>Suzy Pask</i>
G23	Y4 - 8	Developing good questions to reveal and guide fractional thinking <i>Catherine Pearn, Max Stephens and Robyn Pierce</i>
G25	Y5 - 10	Using teamwork to motivate students <i>Joe Wright, Joanna Tutos and Paul Wright</i>
G26	Y5 - 10	Algebra - the story continues <i>Mike Clapper</i>
G27	Y5 - 11	Hanlon's handy hints <i>Stephen Hanlon</i>
G31	Y7 - 12	Proofs, patterns and geometry - a new Year 10 mathematics option at Camberwell High School <i>Geoffrey Menon and Ursula Parker</i>
G33	Y7 - 12	Mindfulness in the secondary school classroom <i>Elizabeth Shepherd</i>
G34	Y7 - 12	Critical and creative thinking in the maths classroom <i>Karen McMullen</i>
G35	Y7 - 12, VCAL	Problem solving in ancient China <i>Terence Mills</i>
G36	Y7 - 12	101 problems worth coding <i>Peter Fox</i>
G39	Y9 - 10	Using TI-Nspire CAS in the middle years mathematics classroom <i>Shane Dempsey</i>

G42	Y1 - 12	The four proficiencies strands plus one? Productive disposition and the Australian Curriculum: Mathematics <i>Aimee Woodward</i>
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SESSION G-H: 11AM-1.20PM

G-H1	F - 12	Individualised learning without the headaches. Using Maths Pathway <i>Paul Rowland</i>
G-H2	F - 7	STEM in the Victorian Curriculum <i>Britt Gow and Emma Castelow</i>
G-H3	Y11 - 12	SAC's for Mathematical Methods courses (application tasks) <i>Sanjeev Meston and Ryan Tebble</i>
G-H4	Y3 - 8	Making fractions exciting - What does excellence in teaching fractions look like? <i>Tina Fitzpatrick, Anthony John Davies and Abby Hansen</i>
G-H5	Y4 - 8	The robots are coming - using robotics and coding in maths education <i>Mark Gleeson and Martin Demonsthenous</i>
G-H6	Y5 - 9	Warm-ups and tuning-in <i>Lynne Laursen and Anjana Dwivedi</i>
G-H7	Y6 - 12	Informatics: challenging, Inspirational and relevant coding <i>Jan Honnens</i>
G-H9	Y7 - 12	Creating interactive learning experiences in Desmos <i>Samuel Hannah and Chris McCarty</i>
G-H10	Y7 - 12	Mathematica: M.A.T.H.S. in action <i>Rohan Barry and Ian Berryman</i>
G-H11	Y9 - 12	Square numbers - not as 'square' as you might think! <i>Anthony Harradine</i>
G-H12	Y5 - 11	Fraction attraction <i>Greg Sheridan</i>

SESSION SUMMARY FRIDAY (cont.)

SESSION H: 12.10PM-1.10PM

H1	F - 10	Essential Assessment -assessment and curriculum made easy <i>Andrew Spitty</i>
H2	F - 10, VCAL	Maths mindsets in the classroom <i>Leanne McMahon and Anna Bock</i>
H4	F - 12, VCAL	Making Maths300 work for you <i>Doug Williams</i>
H5	F - 2	Step by step – building maths success for every student <i>Catherine Davidson, June Penney and Jenny Dockery</i>
H6	F - 4	The importance of developing children’s counting skills: The move from rote to rational counting <i>Catherine Pearn</i>
H7	F - 6	Let’s get started! Using games to promote fluency and reasoning <i>Ellen Corovic</i>
H8	F - 6	Collaborative maths leadership - cultivating collective efficacy amongst teachers <i>Jen Briggs and Jade Seddon</i>
H9	F - 8	Using ‘I can..’ statements for planning, assessment and learning <i>Patricia O’Hara</i>
H10	F - Adult	Don’t get caught up in alternative facts. How you can be more efficient and have greater impact when analysing student data <i>Kathryn Sobey and Michaela Epstein</i>
H11	F - 12, VCAL	Seeing maths <i>Vicky Kennard</i>
H12	Y1 - 10	Compliance and inequality OR mathematics? Which are you teaching? <i>Jude Ocean</i>
H13	Y1 - 8	Using the Bar Model method to solve multi-step word problems <i>Lei Bao</i>

H15	Y10 - 12	Approximations, recursion and sampling using the technology of the Casio ClassPad <i>Kevin McMenamin</i>
H16	Y2 - 6	How to successfully teach place value: the latest research <i>Angela Rogers</i>
H17	Y2 - 7	Challenging tasks: multiplicative thinking and productive struggle <i>Sharyn Livy and Ann Downton</i>
H18	Y3 - 10	Engaging students in applied maths that deals with real life using real data <i>Richard Korbosky</i>
H19	Y3 - 7	How an inquiry approach to mathematics promotes learner agency <i>Fiona Clarke and Megan Wurm</i>
H20	Y3 - 8	Developing algorithmic thinking in the primary and junior secondary years <i>Max Stephens</i>
H21	Y4 - 10, VCAL	A numeracy intervention program achieving outstanding growth <i>Michelle Anderson and Helen Barker</i>
H22	Y5 - 10	The dog ate my homework <i>Joe Wright, Joanna Tutos and Paul Wright</i>
H23	Y5 - 12	Strategies for differentiation in the mathematics classroom <i>Thomas Moore</i>
H24	Y5 - 8	Complexity factors in mathematics assessment items <i>Jim Spithill and Jen Halliday</i>
H25	Y5 - 8	Algebraic thinking through the use of Cups and cubes <i>Nick Serafidis and Val Steane</i>
H26	Y5 - 9	Targeting student need in mathematics, our experience using Maths Pathway <i>Deborah Murrell</i>
H27	Y7 - 10	Are you struggling to engage middle school students in the maths classroom? <i>Adam Kruger and Scott Rumble</i>
H28	Y7 - 10	Searching, sorting, algorithmic thinking and maths <i>Nat Bradshaw</i>
H29	Y7 - 10	Small changes towards a bigger impact <i>Vanessa Rule-Paddle and Antje Leigh-Lancaster</i>

H30	Y7 - 11	Advanced, standard and remedial maths – how to create a successful secondary program that really works! <i>David Greenwood and Simone Zmood</i>
H31	Y7 - 12	Increasing discussion and interaction in mathematics classes <i>Nicola Petty</i>
H32	Y7 - 12	What were you thinking? <i>Dietmar Schaffner and Zoe Schaffner</i>
H33	Y7 - 12	Mindfulness in the secondary school classroom <i>Elizabeth Shepherd</i>
H34	Y7 - 12	CASIO education resources – a guided tour <i>Alastair Lupton</i>
H35	Y7 - 12, VCAL	Origami, maths and reverse engineering <i>Jan Mann and Ming Gao</i>
H37	Y8 - 12	An interactive statistical sampling activity with chocolate <i>Anthony Morphett and Sharon Gunn</i>
H38	Y9 - 10	Using TI-Nspire CAS in the middle years mathematics classroom <i>Shane Dempsey</i>
H39	Y7 - 12	Mathematica, an introduction and more <i>Ian Willson</i>
H40	Y7 - 10	Delivering excellence in financial literacy <i>Damien Nicholson</i>

SESSION I: 2.30PM-3.30PM

I1	F - 10	Maths in the mulch: real-life learning through a kitchen garden program <i>Rebecca Naylor and Stephanie Davies</i>
I2	F - 10	Mindset: where is your head at? <i>Christopher Daxecker and Stephanie Black</i>
I4	F - 12, VCAL	MAV student activities – enhancing problem solving and inquiry <i>Jennifer Bowden and Helen Haralambous</i>

I5	F - 2	Increasing challenge and problem solving for Year 1 students <i>Michael Bairstow, Holly Phillips and Alyssa Galea</i>
I7	F - 8	Handling hands on <i>Jacinta Blencowe</i>
I8	Y1 - 4	Differentiation and rich tasks: SAEPS our journey <i>Haylie Saarinen and Tristan French</i>
I9	Y1 - 8	Making mathematics teaching exciting <i>Charlotte Wilkinson and Sherryl Gomm</i>
I10	Y10 - 11	Maths and music <i>Neale Wood</i>
I11	Y10 - 12, VCAL	VCAL numeracy meets Edison Robots <i>Kath O'Shea</i>
I12	Y10 - 12	Specialist SAC Application Tasks modelling examples from astronomy <i>Wayne Semmens</i>
I13	Y10 - 12	Learning experience with calculus <i>Chan Yew Fook</i>
I14	Y11 - 12	Teaching VCE Mathematical Methods for the first time - some tips and tricks <i>Mary Papp</i>
I15	Y2 - 10	Sphinx again <i>Doug Williams</i>
I16	Y2 - 12	Developing mathematical fluency at all levels through rich tasks <i>Nicola Petty and Shane Dye</i>
I17	Y3 - 10	Automatic recall of basic number facts <i>Johanna Crisp and Kerri Goode</i>
I18	Y3 - 6	Assessing mathematical reasoning <i>Sandra Herbert and Colleen Vale</i>
I19	Y3 - 6	Multiplication with meaning <i>Justine Shelley</i>
I20	Y4 - 10	The mathematics of magic <i>Greg Carroll</i>
I21	Y4 - 10	Number genetics <i>Mike Clapper</i>
I23	Y5 - 12	Engaging hooks <i>Thomas Moore</i>

SESSION SUMMARY FRIDAY (cont.)

I24	Y5 - 12, VCAL	My students don't know their tables! <i>Michael O'Reilly and Norrian Rundle</i>
I26	Y5 - 8	Teaching line graphs through emotions <i>Jude Ocean</i>
I27	Y7	Integrating algorithms and coding into the mathematics classroom <i>Chris Paragreen and Bernie McGrath</i>
I28	Y7 - 10	Deep learning - powerful mathematics <i>Jim Lowe</i>
I29	Y7 - 10	Mathematica for the Victorian Curriculum 7 - 10 <i>David Leigh-Lancaster</i>
I30	Y7 - 12, VCAL	Origami, maths and reverse engineering <i>Jan Mann and Ming Gao</i>
I31	Y7 - 12	STEM: Women are (still) all over it <i>Katherine Seaton</i>
I32	Y7 - 12	Desmos: graphing and animations <i>Roger Walter</i>
I33	Y7 - 12	Flipping out! How I flipped my maths classroom and you can too! <i>Aimee Shackleton</i>
I34	Y7 - 12	Education Perfect: empowering and promoting self-regulated learning <i>Clare Feeney</i>
I35	Y7 - 12, VCAL	Wolfram Mathematica for statistics and data analysis in Year 7-10 curriculum <i>Craig Bauling</i>
I37	Y7 - 8	SURVIVORing Year 7 Mathematics <i>Ann Kilpatrick</i>
I38	Y8 - 10	Maths or knot maths? <i>Norman Do, Rebecca Cooper and Joanne Burke</i>
I39	Y9 - 12	Encryption using Python (applied probability) <i>Sanjin Dedic and Nat Bradshaw</i>
I40	Y9 - 12	Exploring the parabola <i>Shane Scott</i>

I41	Y9 - 12	The mathematics of wing design – an excellent example of where maths is used in modern civilisation <i>Michael O'Connor</i>
I42	Y7 - 12, VCAL	The essential elements of lessons that include all students in building understanding, solving problems and reasoning mathematically <i>Peter Sullivan</i>
I43	F - 12, VCAL	Quarter the Cross: fractions, geometry and reasoning for all levels <i>David Butler</i>

SESSION I-J: 2.30PM-4.40PM

I-J1	Y1 - 11, VCAL	The crucial and underpinning role that language plays in the teaching and learning of maths and numeracy <i>Dave Tout</i>
I-J2	Y5 - 12, VCAL	Embedding ongoing student-focused, assessment, feedback and guidance strategies <i>Craig Becker</i>

SESSION J: 3.40PM-4.40PM

J1	F - 12	Training teachers in East Africa <i>Jenny Clark</i>
J3	F - 2	Co-teaching in mathematics: powerful learning for students and teachers <i>Rebecca Stewart</i>
J4	F - 6	From closed to open - differentiated investigations allowing students to become proficient mathematical learners <i>Brendan Hodge, Karyn Thomas and Kristy Miller</i>
J5	F - 6	Exploring problem solving: Fermi problems <i>Haylie Saarinen and Lana Dimitrijevic</i>

J6	F - 6	Getting creative with maths and growth mindsets <i>Rebecca Harris</i>
J7	F - 9	Mathematics is a fun activity with folding paper <i>Karim Noura</i>
J8	Y10 -12	Learning experience with calculus <i>Chan Yew Fook</i>
J9	Y10 -12	Specialist SAC Application Tasks modelling examples from astronomy <i>Wayne Semmens</i>
J10	Y11 - 12	Introduction to programming using TI-Nspire <i>Raymond Rozen</i>
J11	Y12	Teaching algorithmic thinking - VCE algorithmics (HESS) <i>Georgia Gouros</i>
J12	Y2 - 12	How to write excellent multiple-choice items <i>Liz Spielman and Fiona Hay</i>
J13	Y2 - 7	Books and numbers in a box <i>Jude Ocean</i>
J14	Y3 - 10	Menu maths: a model for making mathematicians <i>Doug Williams</i>
J15	Y3 - 10	Algorithms and coding content in the new Victorian Curriculum <i>Megan Blanch</i>
J16	Y3 - 6	Planning and assessing mathematical reasoning <i>Aylie Davidson, Leicha Bragg and Christine Borcek</i>
J17	Y4 - 12, VCAL	Get more girls involved with STEM with Adobe <i>Tim Kitchen</i>
J18	Y4 - 8	Differentiation without technology: Using enrichment problems for Stages 3 and 4 <i>Anne Prescott and Pauline Kohlhoff</i>
J19	Y4 - 9	How to teach decimals better <i>Michael O'Reilly</i>
J20	Y5 - 10	Is perfect differentiation impossible? These teachers found a way AND saved marking/prep time <i>Luke D'Astoli</i>

J21	Y5 - 12	The game of SET <i>Amie Albrecht</i>
J22	Y5 - 12	Using technology to provide quality feedback <i>Thomas Moore</i>
J23	Y5 - 12, VCAL	Forming hypothesis – data collections and using online free Google Apps <i>Iqbal Hossain and Fahmida Hossain</i>
J25	Y5 - 9	Thinking outside the strand <i>Helen Booth</i>
J26	Y6 - 12, VCAL	Cloud-based planning, tracking and reporting for easy differentiation in today's classrooms <i>Bill Murray and Victoria Pichler</i>
J29	Y7 - 12, VCAL	ADUSU ALGEBRA™ <i>Ruth Adusu</i>
J30	Y7 - 9	Shifting the narrative: DET, MAV and Chaffey Secondary College partnership program <i>Ann Kilpatrick and Megan Lewis</i>
J31	Y9 - 11	Harry Houdini and maths <i>Chris Ireson</i>
J32	Y5 - 8	What is coding? - an introduction and some basic resources. <i>Helen Haralambous</i>
J33	Y10 - 12	Understanding finance - the General and Further Mathematics courses <i>Rod Vermay</i>
J34	Y7 - 12	FREE resources <i>Peter Fox</i>

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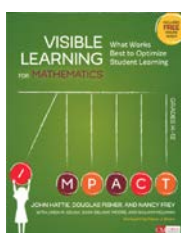


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VISIBLE LEARNING FOR MATHEMATICS

Rich tasks, collaborative work, number talks, problem-based learning, direct instruction...with so many possible approaches, how do we know which ones work best? In *Visible Learning for Mathematics*, six acclaimed educators assert - it's not about which one, it's about when. Equipped with video clips, planning tools, rubrics, and templates, you get the inside track on which instructional strategies to use at each phase of the learning cycle - the surface learning, deep learning or transfer phase.

EY-12

\$55.77 (MEMBER) \$69.71 (NON MEMBER)
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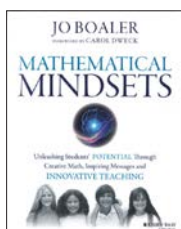


PASMAP - BOOK 1

The Pattern and Structure Mathematics Awareness Program is a network of related learning experiences developed for children. It is based on research evidence that the foundation of mathematical development is an awareness of mathematical pattern and structure, and that engaging children in exploring core patterns and their structure leads to an improvement in general mathematical understanding. PASMAP focuses on developing children's awareness of the patterns and structures that underlie the concepts and processes common to all the early AC strands.

F-2

\$66.38 (MEMBER) \$82.98 (NON MEMBER)
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MATHEMATICAL MINDSETS

This book provides practical strategies and activities to help teachers and parents show all children, even those who are convinced that they are bad at maths, that they can enjoy and succeed in maths. Jo Boaler Stanford researcher, professor of maths education, and expert on maths learning has studied why students don't like maths and often fail in maths classes. This book bridges that gap by turning research findings into practical activities and advice. Boaler translates Carol Dweck's concept of 'mindset' into maths teaching and parenting strategies, showing how students can go from self-doubt to strong self-confidence. *Mathematical Mindsets* provides a proven, practical roadmap to mathematics success for any student at any age.

1-VCAL

\$26.34 (MEMBER) \$32.93 (NON MEMBER)
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QUATERNIA

14 year old Ivan is mathematically gifted and obsessed with gaming. Excelling in online war games, he falls behind in his studies, withdraws from family and friends, and is manipulative in satisfying his obsession. A mysterious, online exchange introduces him to equipment that enhances the gaming experience. Through Ivan, his mirror image, he embarks on a quest for the secret of Quaternia, a virtual world where mathematical ideas come alive.

9-VCAL

\$14.50 (MEMBER) \$18.13 (NON MEMBER)
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BEEP BEEP, VROOM VROOM

The yellow cars beep! The red cars vroom! As Molly plays with her big brother's toy cars, readers will see and recognise patterns, an essential first step in learning to reason from the specific to the general. But can Molly put the cars back in the right order before her brother returns?

EY-2

\$9.75 (MEMBER) \$12.19 (NON MEMBER)



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**SESSION
DETAILS:
THURSDAY
7 DECEMBER**

KEYNOTES, SESSION A, Thursday, 9am-10am

A1 Engagement and mathematics: What is it, and what does it look like?

Primary - middle years

Catherine Attard, Western Sydney University

In this presentation, I will explore the construct of engagement and I will discuss a range of practical, hands-on ideas to enhance the teaching and learning of mathematics and increase student engagement with mathematics.

A2 Playful and joyful maths

All levels

David Butler, University of Adelaide

This session is about how to take a playful approach to your maths in order to find more joy. David will share his experiences running puzzle sessions and providing maths learning support to thousands of students.

A3 Making and breaking conjectures

All levels

Dan Finkel, Math For Love

This keynote will unpack the process of making conjectures and breaking them with counter examples, and see the shift in mathematical outlook and classroom culture that results when you use this process with students.

A4 Maths Bootcamp and the lessons I learned...

Secondary

Hayley Dureau, Mount Waverley Secondary College

Hayley will share the story of the Maths Bootcamp program she developed for her Year 12 Maths Methods students and how the program changed the way she teaches today.

A5 Strategy choice is key for building number fluency: New approaches for teaching the basic facts to children who are falling behind

Y2-8

Sarah Hopkins, Monash University

In this presentation, Sarah will draw together findings from the literature and her own individual case studies of children in Years 2- 8, to suggest what teachers can do to target children's individual difficulties with developing basic number fluency.

A6 Two oldish codgers reflecting on what excellence means in maths education, with a focus on the critical role of assessment

All levels

Dave Tout and Ross Turner, ACER

This presentation will be an opportunity for two aging men to reminisce about the lessons they have learned over that period, and reflect on what they see as achieving excellence in maths education.

For full abstracts of keynotes, see page 5.

SESSION B, Thursday, 11am-12pm

B1 Big ideas for young minds

Foundation, Repeat, Workshop
Brian Doig, Deakin University

The Russian psychologist, Davydov, in the spirit of Vygotskii, theorised and experimented with young children learning mathematics through play to develop problem solving skills. This work was based on play with materials with the characteristics of length, mass, area, and volume. Following this example, we will look at how the prior-to-school educator can build children's early mathematical experiences using common materials and lots of language. This approach builds solid concepts for measurement, and while not claiming that we can achieve the same as Davydov's Russian children, we can at least explore the possibilities of a better start to mathematics.

B2 The mathematical world of Indigenous Australians

F – 10, Repeat/Commercial, Lecture
Andrew Crisp, Mathspace

Mathematics is truly universal; at the same time, the way an individual thinks and communicates mathematically is deeply embedded in the social practices and culture in which they are raised. Early attempts by Western thinkers to understand the mathematics of Indigenous Australians (and other Indigenous groups around the world) were influenced by a cultural narrative of Western superiority that lingers to the present day. This talk explores the unique insights that can be gained by a more inclusive (and accurate!) view of Indigenous Ethnomathematics, in both the mathematical and cultural realms, and how to bring these ideas to life in your classroom.

B3 Improving students' outcomes through the use of assessment diagnostics

F – 12, VCAL, Commercial/Repeat, Lecture
Alexander Young, Ingenious Technological Enterprises TAS

The author collaborated with schools in three states to develop a 'world first' means for teachers to monitor the quality of their teaching using 'assessment for learning'. This has enabled teachers to 'change their lives and that of their students', or as a speaker at the ACEL 2012 conference put it; 'The students in her school, on average, learn at twice the pace of the nation and at twice the usual depth'. The author has found a large proportion of schools' NAPLAN results appear to be 'flat lining' whereas licensees' NAPLAN results are improving, year on year.

B4 Mathematical investigations in the early years

F – 2, Workshop
Ben Kelso and Alex Berry, Derrimut Primary School

Engaging young learners through rich open tasks that are hands on, kinaesthetic, fun and full of learning! You will see first-hand examples of how you can develop units of work that draw out the big ideas and proficiencies on a daily basis through open – ended investigations. These investigations are purposeful to students as they are connected to the learner's real life contexts and integrate other areas of their learning. The units can be adapted to suit your learners and allow students to bring their own thinking and learning strategies to the task.

B5 Tip of the iceberg - how to find the best rich tasks for your teaching context

F – 6, Repeat, Workshop
Jennifer Bowden, MAV
Nadia Walker, Benton's Junior College

In this workshop, we will share our favourite resources in choosing effective rich tasks. Based on our own research, coaching and classroom teaching experience we will explore Victorian teachers' criteria for choosing rich tasks used in their classroom. We will share tips and ideas in developing your own rich tasks to allow for effective differentiation, authentic and engaging activities. Rich tasks are often the most effective way to assess students learning and inform planning against content strands and the proficiencies. We will complete and analyse a rich task and develop it to suit your teaching and learning context.

B6 It's called number AND ALGEBRA: algebraic thinking across primary years

F – 6, Repeat, Workshop
Tim Colman, Windsor Primary School

Algorithmic thinking provides opportunities for students to follow and create a well-defined set of instructions to perform a task or solve a problem. We often focus purely on numbers, without linking algebraic problem solving skills. Promoting algebraic thinking encourages and increases students' ability to solve problems using different strategies. This workshop will outline a series of ten lessons from Foundation to Year 6 that challenge students with the opportunity to explore algorithmic thinking. These lessons have been successfully used in classrooms, and are available online with enabling and extending prompts. Come and explore why algebra is much more than just x and y !

SESSION B, Thursday, 11am-12pm (cont.)

B7 Embedding the proficiencies in the primary years

F – 6, Workshop

Cathy Davidson, Jan Morahan and Jayde Clayton,
Bacchus Marsh Primary School

At Bacchus Marsh Primary School, a numeracy improvement strategy was adopted to develop problem-based learning that reflected our shared understanding around the importance of the proficiencies. This year our professional learning community work has been around how to assess the proficiencies, through the development of common assessment tasks with accompanying rubrics. Having trialled these with students, we have faced challenges around student disposition, mindsets, classroom talk and mathematical terminology. Our work continues.

B8 How to use concept cartoons to address common student misconceptions

F – 6, Workshop

Angela Rogers, RMIT University
Bern Long, St Carlo Borromeo Primary School

This workshop will focus on a powerful assessment idea which allows the Victorian Curriculum proficiencies of reasoning, understanding and problem solving to be assessed simultaneously. Concept Cartoons encourage mathematical debate amongst students, have applications from F-6 and allow teachers to target common misconceptions within their class. We will provide teachers with practical guidance on how to introduce, design and implement concept cartoons in your classrooms. Finally we will show how we have successfully included Concept Cartoons in student assessment portfolios to showcase their learning and model to parents the thinking we value in our mathematics classrooms.

B10 One task for all - an inclusive teaching approach that encourages growth mindsets

Y1 – 6, Repeat, Workshop

Russell McCartney, Chris Terlich and Sean Webb,
Wonthaggi State and Wonthaggi North Primary School

No ability groups, just respectful engaging tasks that all students can access. The session is a variety of low floor - high ceiling tasks that provide multiple levels of challenge. This approach builds students' understanding and reasoning around mathematical concepts.

B12 'One off' activities

Y10 – 11, Repeat, Workshop

Sue Scott and Leah Whiffin, Bendigo Senior Secondary College

This session is designed for graduates who need 'one off' activities in general maths to break up a two hour mathematics class.

B13 The Bisection Method and Newton's Method

Y11 – 12, Repeat, Lecture

Brian Stokes, Monash University

In the current VCE Mathematics Study Design (2016-2018) for the subject Mathematical Methods, additional algebra material has been added as follows: Numerical approximation of roots of simple polynomial functions using the Bisection Method and numerical approximation of roots of cubic

polynomial functions using Newton's Method. The purpose of this presentation is to discuss these two methods and to illustrate their application with examples. In addition, exercises will also be provided together with their solutions.

B14 VCAL responsible gambling Victoria units

Y11 – 12, Workshop

James Gray, Peter Lalor Secondary College

Responsible Gambling Victoria in conjunction with MAV have been developing new VCAL units of work this year for presentation in 2017. The VCAL units will address all three VCAL levels – Foundation, Intermediate and Senior in areas such as budgeting, statistics and probability. Teachers will be given resources that can be instantly used in the classroom to investigate issues around responsible gambling. The workshops will take on a hands-on approach and participants will see the units in action and hear from teachers and students that have trialed the units.

B15 2016 Math Methods Examinations

Y12, Lecture

Allason McNamara, Trinity Grammar School and Mary Papp

Mary and Allason will do a similar session to the 2017 MAV Meet the Examiners Lecture for Mathematical Methods as well as discuss common errors from previous years. The Northern Hemisphere exams will be discussed.

B16 Let's crack open a Year 12 SAC: a look into a Maths Methods application task!

Y12, Workshop

Trang Pham and David Symington

We are now well and truly into the second year of the accreditation period from 2016-2020. What was your Application Task writing journey like? Did you ensure that it has met the following criteria: a mathematical investigation based on a context involving content from two or more areas of study, non-routine and open-ended elements, aspects of students' choice, rubric marking ... and not an extended collection of Examination 2 type questions?

This workshop will disclose some significant techniques of designing and writing the Application SAC that would meet the VCAA requirements. Participants will have the opportunity to further improve this Application SAC as well as to discuss how to allocate the outcomes for each question.

B17 Choosing tasks to foster mathematical reasoning

Y2 – 4, Repeat, Workshop

**Sandra Herbert, Deakin University
Anita Carey, Warrnambool Primary School**

Mathematical reasoning can be challenging to teach and assess. Choosing a task that facilitates primary students' development of reasoning is not easy. In this workshop participants will have the opportunity to trial the number tower task chosen by a primary teacher to address both appropriate content and the reasoning proficiency. The presenter will explain her rationale for the choice of this task and how it was developed into a lesson with potential to assess reasoning. Examples of children's reasoning will be presented and discussed.

B18 Helping students understand division

Y2 – 6, Lecture

Michael Bairstow, St Dominic's

I was always aware that many students I taught had found division really difficult but I didn't understand why or how I could help them, so while undertaking further study I decided to research division. I learnt about the challenges students faced, the two models of division and the strategy of chunking. During this session I will explore my learning, some of the great activities I discovered, how I now teach division and how it has changed how I teach other operations.

B19 Learning fractions with picture puzzles

Y2 – 8, Workshop

Doug Williams

This session offers a differentiated, multiple intelligence approach involving seeing, touching, saying and recording fractions in natural language which precedes and thereby strengthens fluency with their symbolic form. Cuisenaire Rods will be used because they are readily available and bridge to graph paper drawing. Picture Puzzle challenges which drive the session will be accessed through the web. Bring a smart device.

B20 Free online maths resource, supported by Westpac

Y3 – 12, VCAL, Commercial, Lecture

Chris Velis and Megan Blanch, Mathspace

Mathspace has partnered with Westpac to make their online digital textbook, mathspace Essentials, free for all Australian teachers and students.

SESSION B, Thursday, 11am-12pm (cont.)

Mathspace is a new kind of textbook that steps away from the multiple-choice method to meet students where they are really learning during the problem solving process and provide support at each step of their working out.

Find out why Westpac, one of Australia's largest banks, has chosen to partner with Mathspace to help the next generation to achieve a brighter future by strengthening their numeracy skills. Mathspace Essentials for years 3-12, covers the Victorian, Australian and IB mathematics curriculum.

B22 Differentiation without technology: using enrichment problems for Stages 3 and 4

Y4 – 8, Repeat, Workshop

Anne Prescott and Pauline Kohlhoff, APSMO Inc.

In this hands-on interactive workshop we will explore how well-constructed problems can be used for teaching students who are at different stages of mathematical development. Using a variety of solution methods and related classroom activities based on questions from the APSMO Maths Games and Maths Olympiads, we will investigate the enhancement of differentiation in teaching mathematics. APSMO Inc. is a not-for-profit organisation.

B23 3D printing in the classroom and on a budget

Y5 – 10, Repeat, Workshop

Ben Dennis and Liam O'Connor, Terang College

In this session participants will be introduced to 3D printing and how it can be incorporated into the classroom in engaging and meaningful ways. Learn the basics of 3D design with advice on software options and 3D printers. 3D printing is not only for those wealthy few but now an affordable option for most schools. No experience necessary.

B24 Using teamwork to motivate students

Y5 – 10, Repeat/Commercial, Workshop

Joe Wright, Joanna Tutos and Paul Wright, The Educational Advantage

Human competitiveness is a natural driver for most of us, and working in a team harnesses that drive in a non-threatening way. Achieving a goal as part of a team is a rewarding experience. Encouraged by teammates, we become more engaged in an activity, and as a result we learn more efficiently. Interestingly, the ability to work in a team is a powerful predictor for success in the workplace. Join us as we share some practical ideas that use teamwork to promote the growth of the group, but also allow for recognition of individual contributions. Bring a laptop or a tablet.

B25 Mathematical reasoning - forging a path to excellence

Y5 – 10, Lecture

Dianne Siemon, RMIT University

Data from the Reframing Mathematical Futures II (RMFII) project on mathematical reasoning in Years 7 to 10 suggest that students' capacity to explain their thinking and communicate it in ways that make sense to others may well be contributing to, if not largely responsible for, the decline in the number of students choosing to study the more advanced mathematics courses in the senior years. This session will outline progress on the RMFII project and focus on what is needed to support students capacity to reason mathematically, in particular, to create their own mathematical texts and arguments so that they do not have to rely on remembering text/teacher generated templates.

B26 Using technology to provide quality feedback

Y5 – 12, Repeat/Commercial, Workshop

Thomas Moore, Maths Pathway

In this presentation we will look at how you can use Google Drive and a flipped learning approach to deliver high quality feedback videos. We will also discuss the idea of two due dates and how you can get students to provide each other with high quality feedback.

B27 Jumping frogs and algebra

Y6 – 9, Repeat, Workshop
Ian Bull, St Kevin’s College

Playing games that involve the moving and jumping of red and blue frogs as well as being a hands-on experience that appeals to students of a range of abilities opens a whole world of algebra to explain and predict outcomes. Come and play and look at the mathematical content that this simple game brings to life.

B28 Mathematics programs which provide for high potential mathematics students

Y7 – 10, Lecture
Simone Zmood, Monash University

Numerous reports and articles suggest that students who show promise in mathematics are not being schooled to reach their full potential. In a recent study, several school and non-school programs were identified which intentionally provide for those students who have high potential in mathematics. This presentation will include a comparison of the philosophy and characteristics of the programs. In particular, I will focus on the different approaches that the schools have taken to develop integrated whole-of-school mathematics programs which address the mathematics learning environment, content, process, and product, and include elements of acceleration, enrichment, and extension.

B29 STEM in a box

Y7 – 12, Commercial, Workshop
Rodney Anderson, Moreton Bay College, Queensland
Brian Lannen, Murray Mathematics

What is in the box? This box can control motors and lights, read temperature, detect motion and much, much more. This little box can connect to a computer or your TI-Nspire calculator making it a portable, accessible and inexpensive STEM solution! Come along and play as we explore a collection of easy and engaging investigations written and used by classroom teachers. All equipment will be provided and no experience is necessary. See what all the excitement is about. The TI-Innovator really is a STEM solution in a box.

B32 Shining up the staples-delving into evidence informed classroom practices

Y7 – 12, Lecture
Wendy Taylor, Bentleigh Secondary College and Ollie Lovell

Explicit teaching and testing are staples in many mathematics classrooms. This presentation explores ways of improving these routine practices, capitalising on recent research evidence, to increase student engagement and learning outcomes. The talk will focus on practical classroom strategies and conclude with a discussion of how one might lead changes in their school.

SESSION B, Thursday, 11am-12pm (cont.)

B33 Writing instructional material for mathematics

Y7 – 12, Commercial, Workshop
Neale Woods

In this session, Neale Woods will cover a range of skills he uses for presenting mathematical content for both print and online delivery. Skills demonstrated include creating Word templates, formatting hints, MathType formats and shortcuts, writing instructions for various CAS technologies, and converting maths equations for online delivery. The session will be a presentation rather than 'hands on'. However, participants are encouraged to bring a laptop to trial some of the techniques during the session.

B34 Proofs, patterns and geometry - a new Year 10 mathematics option at Camberwell High School

Y7 – 12, Repeat, Lecture
Geoffrey Menon and Ursula Parker,
Camberwell High School

Since 2016 Camberwell High School has offered an optional mathematics program that allows interested students to explore foundational mathematics in more depth, collaborate in problem solving, to present the findings of their own mathematical investigations and review the work of others with a goal of improving each others work. This presentation will cover implementation, planning and how this new subject has been received by students, staff and the CHS community.

B35 From the Banda-copier to the iPad

Y7 – 12, Lecture
Roland Bairstow, King's College, Auckland, New Zealand

Ro will highlight how teaching resources and their methods of production and delivery have changed over the years focusing on the recent developments in digital technology. He will demonstrate the resources he has produced and distributes free to teachers and students. These include eBooks, games, Apps and a content website for Years 7 to12 covering all of the topics covered by most mathematics courses. He will also provide student feedback, comment on how his teaching has changed and the impact on learning and achievement of these new resources.

B36 Feedback: listen and learn

Y7 – 12, Lecture
Hayley Dureau, Mt Waverley Secondary College

Bill Gates said 'We all need people who will give us feedback. That's how we improve'. How often do we ask our students for honest, useful feedback about our teaching practice? When we do ask for feedback, are we really listening to it? Are we learning from it and using it to improve our practice? This session will explore practical and efficient strategies for collecting feedback from students (including the use of Google Forms), and explore how seeking and acting on feedback can create a culture of trust and growth, and enhance student outcomes in mathematics classrooms.

B37 Critical and creative thinking in the maths classroom

Y7 – 12, Repeat, Workshop
Karen McMullen, Killester College

Recent reforms to the Australian and Victorian Curriculum provide a framework for developing students' awareness of metacognition and self-regulated learning strategies. This workshop will focus on developing lessons that require a range of thinking strategies with an emphasis on promoting forethought and self-reflection. Attendees will be given sample lessons and will also have an opportunity to consider how they can apply what they have learnt in their own classrooms.

B40 From little squares, big quadratics grow

Y9 – 10, Repeat, Workshop

Alastair Lupton, Le Fevre High School South Australia

A humble square of paper leads us to wonder, then to reason; and then to see the power of quadratic algebra in order to be sure - beyond all doubt. This introduction to quadratic functions comes with a unit that tackles this time-honoured mathematics in some new ways, and has been taken to new heights with a video-based introduction that you can watch, think about and share with your class. A little handheld technology is used to great effect in this unit, but none is required in the workshop.

B41 Encryption using Python (applied probability)

Y9 – 12, Repeat, Workshop

Sanjin Dedic, Techxellent

Nat Bradshaw, Lowther Hall Anglican Grammar

Every waking second millions of people are talking on the phone, reading emails and text messages. All of this is made possible by encryption which is a method for scrambling (encrypting) data in such a way that it can be only be unscrambled by a person who owns a digital key which can unscramble (decrypt) the data. In this presentation you will have a hands on insight into the coding aspects of encryption as well as the mathematics which can precisely calculate how safe it is. In other words how many guesses (in the millions/billions/trillions) a hacker would have to perform to discover your key.

B42 The integration of mathematics and everyday knowledge: Year 10 mathematics and mathematical literacy learners' solution strategies

Y10, Lecture

France Machaba, University of South Africa

This paper is about the learning of mathematics through integration with contexts that draw on learners' everyday experiences for mathematics and mathematical literacy learners. The study is located within a qualitative approach, adopting a case study which focuses on one secondary school in South Africa. In this school two classes – mathematics and mathematical literacy of approximately 30 learners in each were chosen for writing a contextualised mathematics task. The five learners in each class (mathematics and mathematical literacy) were selected for interviews based on what they have written in written task. Using Bernstein codes of recognition and realisation rules, the study shows that mathematics learners were able to use the connection between mathematics and everyday experiences without compromising either mathematics or every context. In the contrary, mathematical literacy learners were unable to move from context to mathematics

B43 ADUSU ALGEBRA™

Y7 – 12, VCAL, Commercial, Workshop

Ruth Adusu, Carinya Christian School

Ruth Adusu has been a full-time teacher for 30 years before developing a system that allows students to physically build and manipulate expressions, equations and inequalities. Adusu Algebra™ simplifies the many approaches to a variety of questions down to one or two simple rules. It allows students to explore questions from substitution and collecting like terms through solving equations and inequalities and up to simultaneous equations. The kit and technique support correct mathematical working and have improved student recall. It avoids or eliminates common misunderstandings and provides immediate feedback. A student kit will be provided for use in the workshop.

SESSION B-C, Thursday, 11am-1.20pm

B-C1 Individualised learning without the headaches. Using Maths Pathway.

F - 12, Double session/Repeat/Commercial Lecture
Paul Rowland, East Loddon P-12

In 2017 we introduced a new teaching plan for year 9 maths that was going to completely revolutionise the way students learned maths. Although this program was working well, we needed to scale and expand it, which just wasn't possible in its current form. We knew we needed to make a change, but also knew it was going to be a lot of work. That's why we decided to try out Maths Pathway and have never looked back. In this session, you will hear why this change has been so successful for us and how it is impacting our students (and staff) for the better.

B-C2 Fun and games - engaging students in mathematics through games

F - 6, Double session, Workshop
Peggy Ashton, La Trobe University
Jennifer Vincent, Birmingham PS

Games are a powerful tool in the teaching of mathematics. In this workshop we will discuss the value of incorporating games into the maths teaching program. We will explore a selection of games that have been linked to the Victorian Curriculum, Number and Algebra content. While students engage with mathematics in this enjoyable way, valuable assessment information can be recorded. A copy of all materials will be provided (USB).

B-C3 STEM in the Victorian Curriculum

F - 7, Double session/Repeat, Workshop
Britt Gow, Hawkesdale P12 College
Emma Castelow, Fyans Park PS

In this session teachers will develop an understanding of the definition of STEM from a Victorian Curriculum F-10 perspective. The facilitator will showcase some examples of successful STEM units that integrate Mathematics and Science or Technology. Teachers will develop an understanding of how these units are structured and be provided with planning tools to develop their own STEM units.

B-C4 3 Act real world problem solving - include, engage and empower your students

Y1 - 12, VCAL, Double session, Workshop
Craig Becker, Collaborative Strengths

Teachers will be presented with and practise a leading-edge methodology that is truly relevant and real world. Described as 'open-middled', three act problem solving starts with an image, video or demonstration that strategically includes and engages every student, at every level of ability. Designed to promote a collaborative problem solving environment, it builds student confidence and perseverance by exposing purpose and flexibility in the maths they know whilst simultaneously linking it to the curiosity they have. The dynamic role of the teacher will be clearly explained and a large bank of free online resources will be made available.

B-C5 SAC's for Mathematical Methods courses (application tasks)

Y11 - 12, Double session/Repeat, Workshop
Sanjeev Meston and Ryan Tebble, Lakeside College

This session will focus on using CAS technology (TI Nspire) to work through Application and Analysis Task(s) SAC's (School assessed coursework) for the VCE Mathematical Methods course. During this session we will work through some interesting Application task(s) / Analysis and Problem solving tasks by deploying CAS technology effectively and efficiently targeting all three assessment outcomes of the study design.

B-C6 Warm-ups and tuning-in

Y5 - 9, Double session/Repeat/Commercial, Workshop
Lynne Laursen and Anjana Dwivedi, The Grange P-12 College

Akin to physical exercise with requirements of substantial and targeted warm ups, the same preparation can be adopted into mathematics lessons. Research from leading educational practitioners such as Robert Marzano and John Hattie supports the inclusion of warm-up activities and learning hooks, as a preview strategy to a lesson. Furthermore, these above strategies can also be adapted for use as 'tuning-in' tasks part way through a lesson as a gateway to enhance the partitioning of the lesson. This workshop will provide practical strategies for implementing this pedagogy into your mathematics lessons.

B-C7 Teaching with algebra tiles

Y6 - 10, Double Session/Commercial, Workshop
Michael O'Reilly and Norrian Rundle

'Algebra Tiles' are a hands-on teaching aid used to introduce and teach middle years students the four operations using integers, as well as the expansion and factorisation of linear and quadratic expressions. Teaching strategies will be explained throughout the session. We will also provide templates to cheaply make your own sets of 'Algebra Tiles'. Although this is a commercial session, the ideas and teaching strategies covered in this session can be implemented in your classroom without purchasing 'Teaching with Algebra Tiles'. 'Teaching with Algebra Tiles' is jointly published by the presenters and the Mathematical Association of Victoria.

B-C8 Algorithms and coding in Years 7-10 using TI-Nspire

Y7 - 10, Double session, Workshop
Frank Moya

In the new Victorian 7-10 Mathematics Curriculum, algorithms and coding in a multi-purpose programming language are required parts of the Number and Algebra strand. In this hands-on workshop, we will unpack and aim to clarify these requirements. Participants will then develop mathematical algorithms suitable for levels 7 to 10, and learn to implement these algorithms using the TI-Nspire Program Editor.

B-C9 Targeted teaching in secondary mathematics - algebra

Y7 - 9, Double session, Workshop
Nancy Surace and Ainslie McIntosh, Catholic Education Melbourne

According to the Grattan Institute (2015) better use of data can improve student learning through targeted teaching. 'Teachers and schools can lift all students' performance if they are equipped to collect and use evidence of individual student achievement and progress'. This workshop aims to improve students' conceptual understanding of variable by exploring a targeted teaching cycle. Participants will use SMART tests as a diagnostic assessment tool, identify algebra misconceptions and plan for targeted teaching to implement in the classroom. This workshop is developed from the Targeted Teaching in Secondary Mathematics program, a professional learning opportunity offered by Catholic Education Melbourne.

B-C10 Coding tasks for middle school mathematics

Y9 - 10, Double session/Repeat, Workshop
David Tynan, Aquinas College

In this workshop, we will look at some examples of how coding can be incorporated into middle school mathematics topics.

B-C11 Middle school mathematics taken off the beaten path

Y9 - 10, Double session/Commercial, Workshop
Luke Bohni and Jennifer Palisse, John Monash Science School

Need some activities a little off the beaten path? Then come along and explore some thought-provoking tasks that are sure to make your students' heads hurt. We will showcase topics that form part of our elective mathematics course at John Monash Science School and include investigating tesseracts, hyperbolic soccer balls, fractal dimensions, magic card shuffling, and even philosophical essay writing topics. Teachers will leave with ready to use activities that could be implemented into their classroom as extension activities or as engaging small projects in the middle-years classroom.

SESSION C, Thursday, 12.10pm-1.10pm

C1 STEM professionals in schools - bringing real world mathematics into the classroom

F - 12, Commercial, Lecture
Kate Maiden, CSIRO Education and Outreach

The STEM Professionals in Schools program creates and supports flexible, ongoing partnerships between STEM professionals and teachers to provide access to real-world STEM. There are currently over 1800 active partnerships across Australia, covering all school sectors and every year level across Primary and Secondary education. During this presentation you will hear about some of our current STEM Professional in Schools partnerships, focusing on those that involve mathematicians. We will look at the types of interactions and activities these partnerships are doing together and the impacts these have on both themselves and their students. We will also explore what makes for an effective and successful STEM Professionals in Schools partnership and recommended ways for teachers to successfully incorporate a STEM Professional partner into their classroom.

C2 Seeing maths

F - 12, VCAL, Repeat, Workshop
Vicky Kennard, Adass Israel School

Often students feel that being good at maths means that they can work fast, do the sums in their heads or with minimal writing. I will be exploring how to make maths visual and how to encourage students to think about maths as a creative and visual activity.

C4 The importance of developing children's counting skills: the move from rote to rational counting

F - 4, Repeat, Workshop
Catherine Pearn, MGSE, The University of Melbourne

In this hands-on workshop participants will discuss the importance of young children developing each aspect of the five counting principles that govern and define counting as elaborated by Gelman and Gallistel (1978). Video excerpts and activities will demonstrate what these counting principles look like in practice. Counting tasks from the Mathematics Online Interview will be linked to the Counting section of the Framework of Mathematical Learning and activities from the Mathematics Developmental Continuum. The conceptual understanding needed to move children from using inefficient strategies to more efficient strategies will be highlighted.

C5 Using rich narratives to engage students in mathematics

F - 6, Workshop
James Russo, Wilandra Rise Primary School and Monash University and Toby Russo, Bell Primary School

Setting students problem-solving tasks that are simultaneously engaging and mathematically important is central to primary mathematics instruction. Often an attempt to develop engaging tasks involves first determining the meaningful mathematics to be learnt and then creating a 'mini-narrative' as a vehicle for exploring these concepts. However, in our experience, the more familiar, enjoyable and deeply developed the narrative, the more engaging the task is for students. Consequently, we demonstrate how there might be value in inverting the process - that is, beginning with rich narratives and mapping on the mathematics - through creating mathematical tasks embedded in examples of well-known children's literature.

C6 '...so form becomes feeling.' - the mathematics of block play

F - 6, Workshop
Cameron Lee, Green Hat Workshop

When the famous American Architect, Frank Lloyd Wright, reflected on his earliest experiences of shape, angles and solid form, it was in kindergarten with blocks. During this workshop we will examine the mathematical value of open ended, self-directed block play across the pre-operational and concrete operational stages of cognitive development.

C7 Exploring addition and subtraction through mental computation

F – 6, Workshop

Catherine Epstein, MAV

The Victorian curriculum calls on us to encourage and develop efficient mental strategies to solve addition and subtraction problems. What are these strategies? How do we guide the children to select and apply these? In this hands-on workshop we will investigate a couple of rich problems and games that encourage mental computation. Explore the strategies that could be used and discuss the ways the tasks can be differentiated through enabling and extending tools.

C8 Let's get started! Using games to promote fluency and reasoning

F - 6, Repeat, Workshop

Ellen Corovic, MAV

Teachers will be elbow deep in dice and cards during this workshop. The session will focus on developing mathematical fluency and reasoning in students through the use of hands-on and engaging card and dice games. Teachers will be armed with a range of activities and we will explore how to easily differentiate for a range of student learning needs.

C9 Lessons and tasks that encourage mathematical inquiry: reSolve Project

F – 6, Workshop

Nadia Walker, Benton Junior College

Referencing the reSolve: Mathematics by Inquiry project, this session will explore the benefits of an inquiry, problem-solving approach to build deep and flexible mathematical understandings for all students. This session will also incorporate the notion of 'challenge' as an essential ingredient in mathematical inquiry. This will be a hands-on workshop exploring lessons and tasks from the reSolve: Mathematics by Inquiry resources, so be prepared to get involved!

C10 Working mathematically with infants

K – 2, Workshop

Doug Williams

Children learn more and teachers love it. Developed by teachers who are engineering their classrooms to enhance children's number sense, working mathematically with infant's splices, threaded activities from Calculating Changes with investigations adapted from Mathematics Task Centre and Maths300. Access to Maths300 is not necessary, but

enriches if available. Threading is a teaching technique using rich, differentiated activities for small amounts of time often. The workshop introduces sample activities and investigations and the planning model teachers have developed to implement them. Mathematical conversation and learning in community - whole class and small groups - are key features.

C11 One task for all - an inclusive teaching approach that encourages growth mindsets

Y1 - 6, Repeat, Workshop

Russell McCartney, Chris Terlich and Sean Webb, Wonthaggi State and Wonthaggi North Primary School

No ability groups, just respectful engaging tasks that all students can access. The session is a variety of low floor - high ceiling tasks that provide multiple levels of challenge. This approach builds students' understanding and reasoning around mathematical concepts.

C12 Making mathematics teaching exciting

Y1 - 8, Repeat, Workshop

Charlotte Wilkinson, New Zealand
Sherryl Gomm, Awapuni School, Gisborne, New Zealand

A journey, moving from 'doing' problem-solving to teaching and learning' through' problem-solving. A significant pedagogical shift. Taking the plunge, overcoming barriers, accessing support, surviving the doubt, reaching the rewards. Co-presented by a primary mathematics consultant and a mathematics team leader/classroom teacher using real students work to map the journey.

C13 'One off' activities

Y10 - 11, Repeat, Workshop

Sue Scott and Leah Whiffin, Bendigo Senior Secondary School

This session is designed for graduates who need 'one off' activities in general maths to break up a two hour mathematics class.

C14 ClassPad excellence for upper school students

Y10 - 12, Repeat, Lecture

Charlie Watson, The Tuition Centre, WA

How does excellence in the math classroom or exam hall arise in the use of ClassPad? This hands-on workshop is designed for teachers who want to develop excellence, build their skills and pick up tips and tricks with ClassPad that will be useful for them and their students in Further, Methods and Specialist classes. We will hop between courses and applications.

SESSION C, Thursday, 12.10pm-1.10pm (cont.)

A reasonable working knowledge of ClassPad will be assumed for the hands-on part, but if that's not you, just come along, sit back and see what's possible.

C15 Formative assessment using Desmos in Mathematical Methods

Y11 – 12, Lecture

Bryn Humberstone and Sarah Bortolotto, Caulfield Grammar School

Desmos is known to many as a free and highly intuitive graphing calculator suitable for classroom demonstrations. It is also a highly developed formative assessment package which, combined with its graphing functionality, make it the ultimate toolkit for teaching Mathematical Methods. This year our Year 12 teaching team used Desmos activities extensively to develop visual intuition, identify and correct misconceptions, and even to enhance students' CAS calculator skills. Come to see how we used targeted conceptual activities and weekly check-ins, together with the principles of formative assessment, to enhance our teaching and learning program.

C16 Made by Maths App – VCAL focus

Y11 - 12, Commercial, Workshop

James Gray, Peter Lalor Secondary College

The Made by Maths app looks at four excursions that take students on a mathematical journey of discovery. In this workshop teachers are introduced to the app and then explore La Trobe University, using the MAV Made by Maths app. This workshop concludes with a discussion of how you can use the app to develop excursions for your students and how it can be applied to generate further student activities.

C17 2016 Specialist Mathematics examinations

Y12, Lecture

Allason McNamara, Trinity Grammar School

Philip Swedosh, King David School

Dean Lamson, Kardinia International College

Allason, Philip and Dean will discuss common student errors in the 2016 Specialist Mathematics examinations. An analysis of the multiple choice section will be given; by-hand skills will be discussed and different approaches to answering the extended answer questions will be outlined. The Northern Hemisphere exams will be discussed.

C18 Teaching algorithmic thinking - VCE Algorithmics (HESS)

Y12, Repeat, Workshop

Georgia Gouros, Distance Education Centre Victoria

An exploration of ways to expand students' high order thinking skills so that they can look at a real world problem and be able to formalise a model and a process in order to find a solution. This session will discuss some of the activities used at DECV for helping students learn to think in an analytical way to be able to create an abstract mathematical model of a problem which contains multiple variables, as well as the algorithms to apply to the model to find a solution. In addition to formally defining a solution, students are asked to justify their solutions by using mathematical principles to critically evaluate the efficiency and correctness of proposed solutions by deductive logic.

C19 Engaging students in applied maths that deals with real life using real data

Y3 - 10, Repeat, Lecture

Richard Korbosky, WA

Often problems in mathematics are contrived and have very little meaning to the students. If students enjoy/love football then they will thoroughly enjoy mathematics linked to rounds of the AFL and AFLW seasons. Come along and find out about AFL Footy Maths that involves students in real life problem solving, calculating, interpreting data and making predictions. This footy maths is a classroom strategy that makes maths come alive and gives teachers a strategy to plan for future classroom activities.

C21 What the PONT? A targeted teaching tale

Y3 - 6, Repeat, Workshop

Ben Allen and Chantelle Polkinghorne, Ringwood North Primary School

We have designed a new program at Ringwood North Primary School that allows us to use assessment data in new ways. Across our senior school classrooms, we have assigned curriculum areas for each teacher. Students move in fluid groups to target areas of need, then are extended. Using technology, hands on materials and teaching our students a new program, we have found huge growth in mathematical knowledge.

C22 Developing algorithmic thinking in the primary and junior secondary years

Y3 - 8, Repeat, Workshop

Max Stephens, MGSE, The University of Melbourne

Algorithmic thinking is now part of the Victorian Curriculum. The goal is to teach students how to think logically as they solve problems. Algorithms are the opposite of lucky guesses and/or trial-and-error strategies. They break down a problem into a number of smaller steps in order to develop (test/revise) a structured approach to solving a problem. Students can represent algorithms in everyday language, or as flow charts, or in a simple coding language. Algorithms should arise naturally in mathematics in the primary and junior secondary school years. This presentation will also identify valuable teacher resources for developing algorithmic thinking.

C23 The dog ate my homework

Y5 - 10, Repeat/Commercial, Workshop

Joe Wright, Joanna Tutos and Paul Wright, The Educational Advantage

There are all sorts of excuses given by students for failing to complete their homework, but the true culprit is disinterest. How often have you heard a student say, 'When will I ever use this?' We understand that the disengagement between students and homework needs to be addressed and as educators we know that one size does not fit all. Join us as we present solutions that provide both remediation and differentiation in a meaningful way. This session will be interactive and will explore new and fun approaches to learning. Please bring along your laptop or tablet.

C24 Algebra - the story continues

Y5 - 10, Repeat, Lecture

Mike Clapper, AMT

This presentation continues from the 2013 presentation 'Algebra as story-telling' (also published in conference proceedings). It develops the narrative approach to the teaching of algebra to provide an engaging and empowering experience for students. Examples and resources will be provided.

C25 Strategies for differentiation in the mathematics classroom

Y5 - 12, Repeat/Commercial, Workshop

Thomas Moore, Maths Pathway

The biggest challenge for teachers is developing lessons which cater for a wide range of abilities within their classes. In this presentation we will explore how to differentiate your classes in order to overcome these challenges. We will cover everything from rich tasks and developing good classroom routines to using technology to enhance learning for students of all abilities. I will also cover the Maths Pathway learning model and how this can be used to assist with differentiation.

C26 Hanlon's handy hints

Y5 - 11, Repeat, Workshop

Stephen Hanlon, Braemar College

This practical workshop is a collection of short mathematical tricks that can easily be used with your classes either as a warm-up activity or to initiate a topic, to motivate or spark an interest, or just simply to entertain and bemuse. There is something here for everyone from the graduate teacher to the seasoned campaigner. A similar presentation in 2013 was well received; 'This will be really helpful. Can't wait to stun my class on Monday' - Cathy.

C27 Essential Maths, Cambridge Senior Maths and ICE-EM – A guide to Cambridge's online resources powered by HOTmaths

Y7 - 12, Commercial/Repeat, Lecture

VJ Gunawardana, Cambridge

HOTmaths is Australia's premier online resource to teach and learn mathematics. Cambridge has the newest editions of the Essential Mathematics series (7-10), the newest versions of Cambridge Senior Maths for Australian Curriculum/VCE series (11-12) and the 3rd edition of the ICE-EM series onto the HOTmaths platform. This workshop will highlight

SESSION C, Thursday, 12.10pm-1.10pm (cont.)

how these new titles have been integrated with HOTmaths and demonstrate how to navigate through all three of these interactive resources. Learn how you can make the most of both the student resources and the Learning Management System for teachers. Whilst HOTmaths offers courses for years F-10, this workshop will focus on secondary only.

C29 Fixed vs growth mindsets: students approaches to learning in mathematics

Y5 – 9, Lecture

Kristin Humphreys, Association of Independent Schools of WA and Tracey Rogers, John Wollaston Anglican Community School, WA

Tracey Rogers is a member of the John Wollaston Anglican Community School Year 7 Team. In this workshop, Tracey shares her classroom story about how the use of a growth mindset approach can directly influence student learnings, understandings and successes. In the context of a Year 7 mathematics classroom, this session will reveal key learnings gained through growth mindset pedagogy to improve student learning outcomes. This session also targets those teachers who are interested in embedding a positive psychology approach across the curriculum.

C30 Thinking outside the strand

Y5 - 9, Repeat, Lecture
Helen Booth, AMSI

The amount of content can, at times, seem overwhelming, particularly at middle years. Is there a more efficient way for teachers to cover all the content required while ensuring depth and breadth? This presentation looks at ways to work smarter rather than harder by teaching across strands, teaching number in context and using skills and knowledge learnt in investigations.

C32 Are you struggling to engage middle school students in the maths classroom?

Y7 - 10, Repeat, Lecture

Adam Kruger, Wesley College

Scott Rumble, Parkdale Secondary College

Students learn best when they are motivated to learn by seeing the value and importance of the information presented. This presentation will exhibit our ASAP, a student approach to learning. It is a 7-10 secondary mathematics program, which we developed at our college and are now working with a number of schools to implement this exciting approach to learning mathematics. Throughout the session we will demonstrate how we motivate students to learn, create an interactive atmosphere to allow for student voice, build connections through directed assessments, provide opportunities to apply knowledge to real world situations, challenge and engage students through effective feedback strategies and work through using data as a tool to improve key numeracy skills of our students. By the end of the session, each attendee will walk away with engaging activities and strategies that they can use immediately in their classroom.

C33 What were you thinking?

Y7 - 12, Repeat, Lecture

Dietmar Schaffner, Penleigh and Essendon Grammar School and Zoe Schaffner, The University of Melbourne

Have you ever assessed a student's work and wondered, what were you thinking? This option explores emerging research into inner speech, and what this might reveal about students' mathematical thinking, and reports on the preliminary results of a school-based research project into students' mathematical thinking loosely based on the Descriptive Experience Sampling method pioneered by Russell T. Hurlburt.

C34 7 things I wish I had known 25 years ago

Y7 - 12, Repeat, Lecture

Peter Collins, Dandenong High School

The presenter is an experienced teacher of maths in the Victorian state system. In the years since finishing college, he has found out a number of useful things / techniques that have made things a lot easier. This presentation will ideally suit new teachers to maths and anyone open to new ideas.

C35 Problem solving in ancient China

Y7 - 12, VCAL, Repeat, Lecture

Terence Mills, Deakin University

Problem solving promotes the idea that thinking is fun. The 'Nine Chapters of the Mathematical Art' is an anonymous mathematical work that originated in China at least 2000 years ago. The book consists of 246 problems organised into nine chapters. It is a tour de force in the history of mathematics in China. An English translation was produced by Kangshen, Crossley, and Lun in 1999. The aim of this paper is to present an overview of this book. What can we, in Australia, in 2017, learn about teaching mathematics through problem solving from this ancient work?

C36 Using Wolfram tools in the Victorian Classroom

Y7 - 12, VCAL, Commercial, Lecture

Craig Bauling, Wolfram Research

For 30 years, Wolfram Research has been serving Educators and Researchers. Craig will demonstrate the key features that are directly applicable for use in teaching in the Victoria Science and Digital Technology curriculum. Topics of this technical talk include: practical applications in mathematics, engineering, chemistry, physics, and biology: natural language input: 2D and 3D information visualisation and 3D printing: creating interactive models that encourage student participation and learning: market leading statistical analysis functionality: on-demand chemical, biological, economic, finance and social data: Mathematica uses in Victoria Digital Technology.

The content will help attendees with no prior experience get started with the Wolfram workflow. Since there is a large amount of new functionality, most intermediate users who attend these training sessions have reported learning quite a bit as well. All attendees will receive an electronic copy of the examples, which can be adapted to individual courses.

C37 Mathematica, an introduction and more

Y7 - 12, Repeat, Computer workshop

Ian Willson

This workshop will provide to those with little or no previous experience of Mathematica (now freely available to Victorian secondary students in both state and private schools) an introduction to what it can do and how secondary students can use it as both a computational, learning and discovery tool (arguably cheaper and better than a CAS calculator). Activities and notes will be provided for the workshop and for school classroom use. Areas covered: basic algebra, graphics, statistics, functions and graphs (including circular functions), probability and calculus. The Manipulate function will be demonstrated (a beautiful Mathematica equivalent to CAS slider functionality).

C38 Using your Adobe apps to enhance STEM

Y4 - 12, VCAL, Commercial, Workshop

Tim Kitchen, Adobe

Adobe is the global leader in digital creativity tools. Most schools provide their teachers and students with access to the latest Adobe applications but they are generally underutilised in most curriculum areas other than within arts and media related courses. This session, run by Dr Tim Kitchen (Adobe's Senior Education Specialist for Asia Pacific and former Victorian educator), looks at how a wide range of Adobe applications are helping teachers communicate STEM content. It also shows how students are working with Adobe tools to construct their learning throughout a wide range of STEM related projects.

SESSION D, Thursday, 2.30pm-3.30pm

D1 Prepping for Foundation: the best start – transitioning students from Kinder to Foundation

F - 1, Repeat, Workshop
Bree Collins, Windsor Primary School

It's first day 2018, and the new Foundation students are just walking through the door. What skills and maths knowledge do they bring from Kinder in their backpack? How should teachers fill gaps in knowledge? And what does Foundation Mathematics look like in Semester 1?. This workshop explores transitioning from Kinder to Foundation and will provide hands on examples of the way to structure a mathematics program during Semester 1. We will explore research into assessment practices to inform a Foundation teacher and how best to include families to capitalise on relationships to support student learning. Let's give them the best start!

D2 Essential Assessment - assessment and curriculum made easy

F - 10, Commercial/Repeat, Lecture
Andrew Spitty, Essential Assessment

Essential Assessment provides a consistent whole school approach to summative and formative assessment and curriculum for schools. Essential Assessment allows schools' to assess their students accurately to the curriculum. Also, to provide them with a personalised curriculum for each person, group or class based on their assessment results for each strand or sub-strand and the requirements of each classroom teacher.

D3 Mathletics - what's new?

F - 10, Commercial/Repeat, Computer workshop
Lauren Anderson and Tom Beardsworth

This session will explore the new primary and secondary Mathletics teacher and student interface. We will demonstrate the use of Mathletics to cater for student driven learning and teacher led instruction. We will also discuss ways to use Mathletics to support data driven teaching and learning, as well as using Mathletics as an assessment tool to inform teaching and planning.

D4 Mindset: Where is your head at?

F - 10, Repeat, Workshop
Christopher Daxecker, John Eskander and Stephanie Black, Tarneit P-9 College

Creating a positive mindset in mathematics is difficult. As teachers we often hear 'I can't and it's too hard'. This PL will give you the tools that you need to engage students and change mind sets to 'I can and this is challenging'. We will present a variety of simple practices that can turn classrooms of fixed mindsets into positive and vibrant mathematics classrooms. It will open your eyes to the simplicity of engaging and rich tasks that include creativity and critical thinking. Students will feel empowered and understand that being challenged is not a bad thing and mistakes should be celebrated. We will show you how to model across year levels and content strands to engage students within their learning and so that you can hear the words 'I love maths'.

D5 Training teachers in East Africa

F - 12, Repeat, Lecture
Jenny Clark

This is for teachers with a sense of adventure and a yearning for social justice. Volunteering in a developing country can be rewarding professionally and personally and is a way of seeing the world in a different way. I will be talking about my experiences working with teachers in Uganda and Tanzania in government and private schools with three different organisations over the last 7 years. Maths teachers in Africa are starved of professional development opportunities and are looking for new ways to teach traditional subjects - you could help them and have a lot of fun along the way.

D6 MAV student activities – enhancing problem solving and inquiry

F - 12, VCAL, Repeat, Lecture
Jennifer Bowden and Helen Haralambous, MAV

The MAV has an outstanding Student Activities portfolio with a range of events, competitions and activities for students from Foundation to Year 12. In this presentation, we will share the various activities MAV offer and support. How do you start an investigation? How do you enter the MTQ? What is a MAV Games Day and how do I enter? Can I run one at my own school? I'd love to engage my school community in a Family Maths Night but don't know where to start? This workshop will be hands on, explore investigations and leave you wanting to inspire your students further.

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SESSION D, Thursday, 2.30pm-3.30pm (cont.)

D7 The teacher as learner: favourite tasks and key learnings

F - 4, Workshop

Jill Brown, Australian Catholic University

Mel O'Reilly and Laura Sansonetti, Findon Primary School

We share the early observations of a research project focused on 'teacher as learner' (mathematical and pedagogical content knowledge and reflection), selecting tasks and task types that challenge students conceptual understanding and developing higher level reasoning skills. A school maths leader, a classroom teacher, and researcher share their observations on their participation in the TALR project so far. Favourite tasks and materials (including anchor charts and fluency games), and key learnings will all be shared. It will focus in part on each of the five conference sub-themes.

D8 Making data and statistics matter

F - 4, Workshop

Rachel Azzopardi, Derrimut Primary School

How can you use statistical literacy to help make the data matter to our students? Is it just asking them to find out what their peers favourite colour, pet or game is? A hands on inquiry into how using data collection can make statistics count for your students. Going through the process of how to find out what makes a good data representation. How can you use data every day and link what you need to find out as teachers or learners so that your students are engaged in meaningful and purposeful hands on learning tasks.

D9 Problem solving and the proficiencies at Wedge Park Primary School

F - 6, Repeat, Workshop

Sara McKee and Melissa Lake, Wedge Park Primary School

This session will discuss the implementation of the proficiency strands at Wedge Park Primary School. This session will provide participants with resources they can take back to their school to implement to build their own and other teachers' capacity in the area of the proficiency strands. This session will also focus on how Wedge Park has incorporated Problem Solving into their maths program.

D10 Handling hands on

F - 8, Repeat, Workshop

Jacinta Blencowe, AMSI

Hands on and practical activities are a great way of engaging students in mathematics. In this workshop you have the

opportunity to get 'hands on' with a variety of common resources and open ended tasks to engage students and make maths fun.

D11 Don't get caught up in alternative facts. How you can be more efficient and have greater impact when analysing student data

F - Adult, Repeat, Lecture

Kathryn Sobey, Auburn High School

Michaela Epstein, Maths Pathway

Data analysis: A waste of time? Not even helpful? Don't know where to start? What is not often acknowledged is that data analysis can actually save planning and instruction time, and help you to be more efficient. This session draws heavily on principles of a data-driven cycle, where an ongoing process of assessment and analysis drives impactful classroom teaching. Using this cycle, many leading schools and educators have been able to drive high levels of student growth in learning. Learn powerful ways of getting good information from student data.

D12 Desmos: graphing and animations

Y 7 - 12, Repeat, Lecture

Roger Walter, Editor of Vinculum

Desmos is a free online graphing tool with capacity for animation. I will be looking at some of the possibilities for classroom use. It will include, but not be restricted to, my Vinculum article in Term 2 about projectile motion and Limaçon curves. Desmos can be used on computers, tablets and smartphone.

D13 Maths card games that make you think

Y1 - 10, Commercial, Workshop

Richard Korbosky, WA

The mathematics card games played in this session are suitable for all ages and are linked to the AC Content and the Proficiency strands. This set of maths card games give students the opportunity to see the same concept of mathematics in a variety of ways and develops in the student a range of different thinking strategies. The maths card games also focus on essential number ideas, language of maths and ideas associated with partitioning and flexible thinking and equivalence. They also support teaching and assessment principles, thinking skills, independent learning and differentiation of the mathematics learning environment. The cards are available as physical sets and some have been developed for iPads / iPhones and Android Pads and phones.

D14 Playful exploration to deep questions

Y1 - 6, Workshop

Dan Finkel, Math for Love

Play may be one of the most effective ways to explore new situations and make connections. Still, play without boundaries may not help us to achieve our teaching goals. In this session, we will develop structures and strategies to connect hands-on exploration and deep mathematical questions. We'll also explore how the same manipulatives and tools can remain relevant and dynamic across a span of different grade levels and topics. Let's find ways to make mathematics playful, and play mathematical!

D15 Using the Bar Model method to solve multi-step word problems

Y1 - 8, Repeat, Lecture

Lei Bao, Leopold Primary School

Many primary students throughout schooling have difficulties with word problems, particularly multi-step word problems. There are an increasing number of questions in NAPLAN test that could be solved by applying the bar model method. This presentation will show how to use the bar model method effectively to assist students to solve word problems involving the part-whole relationship, comparison model and multiplicative thinking.

D16 Excelling with eActivities for ClassPad in the upper school

Y10 - 12, Repeat, Lecture

Charlie Watson, The Tuition Centre, WA

Customised eActivities on a ClassPad can offer students considerable time savings when dealing with many types of math problems. The diverse range of applications that can be created and stored in an eActivity is often overlooked by many teachers, from dealing with simple formulas to coding open programs. The aim of this workshop is to share and demonstrate some existing types of eActivities and then for participants to develop their own skills in creating and using eActivities. A reasonable working knowledge of ClassPad will be assumed for the hands-on part, but if that's not you, just come along, sit back and see what's possible.

D17 VCAL numeracy meets Edison Robots

Y10 - 12, VCAL, Repeat, Workshop

Kath O'Shea, Bendigo Senior Secondary College

Why should junior and VCE Mathematics classes get to have all the fun with STEM activities? This session will show

you how simple, cost-effective and engaging it is to use Edison Robots in VCAL Numeracy classes. Teach numeracy by stealth as students meet outcomes by solving hands-on challenges related to estimation, speed, time, distance, direction, design and much more.

D18 A project-based approach to teaching maths for upper-secondary students with special learning needs

Y10, VCAL, Lecture

Celeste Pryke, Christian College Geelong

For the past eight years, I have been teaching maths to Year 10 students with special learning needs. Over this time, I have developed an engaging and achievable set of projects that allow students to be creative and experience the application of maths in a variety of everyday contexts. The project-based approach can help increase students' confidence in their mathematical abilities, as well as personal skill set through service-learning. The projects can be adapted for higher level mathematics in a VCAL classroom.

D19 MAV VCAL hands-on resources

Y11 - 12, Workshop

James Gray, Peter Lalor Secondary College

This session looks at how VCAL teachers use a variety of hands-on materials and apply it in their classrooms. Each of the VCAL strands will be explored through a hands-on activity. As well, the tasks will cover the three VCAL numeracy levels of Foundation, Intermediate and Senior.

D20 Teaching VCE Mathematical Methods for the first time - some tips and tricks

Y11 - 12, Repeat, Workshop

Mary Papp

Presentation of best practices I have been fortunate to witness or be involved in to deal with issues such as setting up the year, handling SACs, how to overcome areas/concepts that students find difficult to grasp, use of CAS, exam technique, time saving free resources and any other questions. Bring a USB and be prepared for active participation.

D21 Intentional fun: enjoying maths for ALL it's worth

Y2 - 12, Commercial, Workshop

Andrew Lorimer-Derham, St Mary's Primary School

A hands-on games extravaganza for Year 2-10 teachers. Learn how to engage students of all abilities with a diverse

SESSION D, Thursday, 2.30pm-3.30pm (cont.)

range of curriculum linked games, carefully crafted to provide rich learning experiences and follow best teaching practise. Build skills, confidence and higher order thinking with activities to get your students 'thinking out loud'. This session is for creative teachers only.

D22 Mathematics and the Commonwealth Games

Y2 - 7, Repeat, Workshop
Pamela Hammond

The theme of 'Mindsets' includes the desire to promote that maths is fun, everyone can do it and its value in society. Embedding school mathematics in relevant and engaging contexts is one way of achieving this. The Commonwealth Games provides an ideal opportunity for students to experience the use of mathematics content that they are learning to an event beyond the classroom in sporting and other contexts, as well as making connections across the curriculum. This hands-on workshop will engage participants in aspects of mathematics and the proficiencies that can be included as part of a program focusing on the Commonwealth Games.

D23 What does excellence in MATHS look like? It is all about relationships and communication

Y3 - 10, Repeat, Lecture
Michael O'Connor, AMSI

Mathematics is the study of relationships. Teaching and learning have as their foundation the relationship between teacher and student. So learning mathematics well relies doubly on relationships. To teach mathematics well also requires excellent communication skills. The primary indicator for this is how well the students understand what we say. This session is a reflection on thirty years of involvement with teaching and learning mathematics; in the classroom, individual tutoring and most recently managing AMSI's Schools Outreach Team. It will include a combination of advice and insights garnered from many sources with examples for multiplication and algebra.

D24 Automatic recall of basic number facts

Y3 - 10, Repeat, Computer workshop
Johanna Crisp and Kerri Goode, Sale College

In 2016 we were concerned Year 10 students were not progressing, and were unable to retain previous learning. As a cohort we noticed they were struggling with basic computation. Research states automatic recall is 60 basic operation questions in 2 minutes at a Year 5 Level (we consider this to be a bare minimum for secondary students).

We tested their basic number facts;

Year 10 2016

- addition/subtraction 24% > 60 questions
- multiplication/division 6% > 60 questions

Whole School (Year 7 - 11) 2017

- addition/subtraction 23% > 60 questions
- for multiplication/division 7% > 60 questions.

We will address the 'importance of automaticity', and the implications of freeing up cognitive space for higher order thinking'. We will show our improvement data, and share the programs we have implemented.

D25 Assessing mathematical reasoning

Y3 - 6, Repeat, Workshop
Sandra Herbert and Colleen Vale, Deakin University

'reSolve: Mathematics by Inquiry' is a national Australian Government funded project that provides Australian schools in Foundation to Year 10 with resources to help students learn mathematics in an innovative and engaging way. The Mathematical Reasoning Research Group (MaRRG) from Deakin University have developed resources for assessing mathematical reasoning for Years 3 to 6. The resources will assist teachers to conduct formative and summative assessment of children's mathematical reasoning. The lecture will present the rubric with identified levels of reasoning appropriate for a range of mathematical domains in Years 3 to 6.

D27 The mathematics of magic

Y4 – 10, Lecture
Greg Carroll, AMSI

Magic is a fun way to engage students with mathematics. A handful of easy tricks will be presented, along with how to perform them, and then we will explore where they can be used to introduce particular topics. A couple of tricks which specifically lead to a discussion on growth mindset will be considered.

D28 Lessons in financial literacy

Y4 – 6, Repeat, Workshop
Carly Sawatzki, Monash University

This workshop aims to excite teachers about the possibilities the Victorian Curriculum brings while modelling what ‘real world’ teaching and learning looks and feels like. Drawing on innovative money and financial mathematics tasks, this session will explore the potential to connect learning areas and capabilities, while asking participants to sensitively consider social justice issues. Particular task design principles will be highlighted so that teachers might feel encouraged to develop tasks that fit their students’ learning needs and interests.

D29 My top 5 success secrets of Ancient China and India for maths teachers today

Y4 – 7, Workshop
Jonathan Crabtree

The fun games you will enjoy in this presentation reveal simple yet deep mathematical insights. Discover the power and simplicity of ancient ideas that unlock many mysteries of maths while you play games! After this session, problems such as -2×-3 and $12 \div -4$ will be child’s play.

D30 Developing good questions to reveal and guide fractional thinking

Y4 – 8, Repeat, Workshop
Catherine Pearn, Max Stephens and Robyn Pierce, MGSE, The University of Melbourne

Fractional thinking with its interconnected constructs is key to understanding number and multiplicative thinking.

Identifying students’ thinking and choosing questions to develop understanding and proficiency is a challenge for teachers. This paper examines the results of six tasks completed by 570 middle years’ students from Victorian schools. These tasks, administered as part of a Fraction

Screening Test, not only reveal students’ thinking but also provide examples for teachers of the type of questions that will guide students forward in their thinking. In particular, questions that prompt ‘reverse thinking’ are often overlooked but are powerful in challenging students to generalise.

D31 Creative geometry learning: A research study of Investigations with the MATHOMAT template

Y4 – 9, Workshop
John Lawton

Geometry is learned by developing a concept image. Despite its importance, this visually based creative process is often treated indirectly, or overlooked entirely, in geometry instruction. 2015 research, involving video recording of Year 5 students using the Mathomat template, found that student visualisation could be made accessible for teachers. Mathomat worked by invoking, and fixing onto paper, student’s imagery. This workshop explores the classroom interactions between students, teachers and Mathomat involved in the study and discusses how these results, together with new research into figural concepts, can be used to teach visualisation of geometry problems more directly.

D32 Is perfect differentiation impossible? These teachers found a way AND saved marking/prep time

Y5 – 10, Commercial/Repeat, Lecture
Luke D’Astoli, Maths Pathway

Do your classes have 25 students with 25 different learning needs? Catering to this properly would take a superhero teacher, and none of us can differentiate perfectly on our own. However, through the Maths Pathway teaching and learning model, there are now over 1000 Australian teachers meeting the individual needs of their students every day. During this talk you’ll discover the system and hear the real life classroom and staff room stories of some of these superheroes.

D33 Engaging hooks

Y5 – 12, Repeat, Workshop
Thomas Moore, Maths Pathway

We’ll explore a range of engaging hooks that can be done in 5-10 minutes at the beginning of each class. These hooks are designed to get students talking and engaging with the mathematics, and are open to all students to experience success.

SESSION D, Thursday, 2.30pm-3.30pm (cont.)

D34 Essential Maths, Cambridge Senior Maths and ICE-EM – a guide to Cambridge’s online resources powered by HOTmaths

Y7 - 12, Commercial/Repeat, Lecture
VJ Gunawardana, Cambridge

HOTmaths is Australia’s premier online resource to teach and learn mathematics. Cambridge has the newest editions of the Essential Mathematics series (7-10), the newest versions of Cambridge Senior Maths for Australian Curriculum/VCE series (11-12) and the 3rd edition of the ICE-EM series onto the HOTmaths platform. This workshop will highlight how these new titles have been integrated with HOTmaths and demonstrate how to navigate through all 3 of these interactive resources. Learn how you can make the most of both the student resources and the Learning Management System for teachers. Whilst HOTmaths offers courses for years F-10, this workshop will focus on secondary only.

D36 How deep is your garden bed?

Y5 - 8, Workshop
Doug Williams

Many teachers know of the Garden Beds problem? However a group I worked with recently were stunned to realise that they could spend a term using this one problem to dig into most of the pattern and algebra curriculum. This workshop is an in depth investigation of Garden Beds to encourage further discussion of the benefits of sticking with a good investigation - even when you think there isn’t enough time in the curriculum. Smart device is recommended for this workshop.

D37 Jumping frogs and algebra

Y6 - 9, Repeat, Workshop
Ian Bull, St Kevin’s College

Playing games that involve the moving and jumping of red and blue frogs as well as being a hands-on experience that appeals to students of a range of abilities opens a whole world of algebra to explain and predict outcomes. Come and play and look at the mathematical content that this simple game brings to life.

D38 Small changes towards a bigger impact

Y7 - 10, Repeat, Lecture
Vanessa Rule-Paddle
Antje Leigh-Lancaster

As technology develops, the way we access information and data has changed. While there is talk about robots replacing current jobs, and the need to prepare students for jobs that don’t exist yet, there is still a need to cover the curriculum. How do we navigate this landscape as teachers?

This session aims to share some small changes to assist your everyday teaching to help students develop problem solving skills, mathematical thinking and to create connections to their world. In this practical session participants will have the opportunity to share ideas and engage with some of the proposed activities.

D39 STEM: Women are (still) all over it

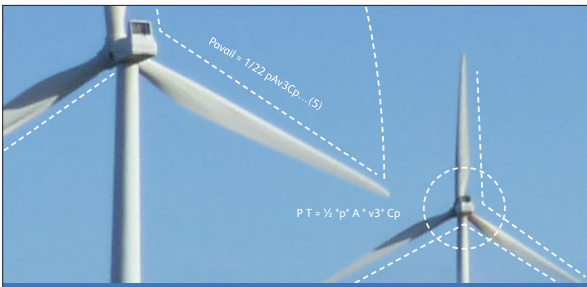
Y7 - 12, Repeat, Lecture
Katherine Seaton, La Trobe University

50 women who have made significant contributions to mathematics and other sciences across continents and centuries were featured in 2015 on a shirt (STEM: Women are all over it). Come and meet some of these women, together with the inspirational women of Hidden Figures.

D40 The secrets hidden in Pascal’s Triangle

Y7 - 12, Workshop
Nadia Abdelal, AMSI

Pascal’s Triangle is a sequence of numbers that has intrigued mathematicians the world over. In this presentation, we will unlock some of the secrets of Pascal’s triangle and work through ways that it has been used throughout history in the areas of patterns, algebra, combinations and geometry. There will be a number of hands on activities and ideas that teachers can take back into the classroom to use with their students in a number of different areas.



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SESSION D, Thursday, 2.30pm-3.30pm (cont.)

D41 Scattered plots: How statisticians think about data using graphs

Y7 - 12, Workshop

David Butler, University of Adelaide

In this session, we'll explore how statisticians think about data using graphs which are all variations on the scatterplot. We will create our own graphs using physical manipulatives.

D43 A tropical logo – exploring the Volivoli Fish with TI-Nspire CAS

Y7 - 12, VCAL, Repeat, Workshop

Roger Wander, MGSE, The University of Melbourne

Logos work best when they evoke positive emotion through simplicity – such is true for the Volivoli Fish. On a recent holiday in Fiji, the presenter found a logo whose mathematical properties were as intriguing as its origins were idyllic. At today's workshop, we'll use technology from scissors and rulers to TI-Nspire Navigator software to share insights as we explore the geometry behind the Volivoli Fish design, and look at how TI-Nspire CAS enables us to pose – and answer – investigative 'what if...?' questions. Mathematical curiosity required, snorkelling gear optional...

D44 SURVIVORing Year 7 mathematics

Y7 - 8, Repeat, Workshop

Ann Kilpatrick

In this presentation, participants will be exposed to a refreshed pedagogical model for the structure and delivery of the Year 7 mathematics curriculum, striving to develop a 'positive psychology' environment rather than a 'maths anxiety' environment, in the hope of seeing students embracing the study of mathematics as a subject to be enjoyed rather than feared. The model embeds key elements of 21st century learning: communication, collaboration,

creative thinking, critical thinking and self-management to enable the development and engagement of students in being 'hands-on, front and centre' in their learning journey with mathematics.

D45 Was that set for homework?

Y7 - 9, Workshop

Wendy Taylor and George Tissera, Bentleigh Secondary College and Sabine Partington, Carey Baptist Grammar

A common approach to homework in high school maths classes is asking students to finish off work that they didn't complete in class. In this talk we will present an alternative approach that involves students completing weekly sheets targeting essential skills. We will unpack how these sheets improve retention, promote a growth mindset in students, cater for the diverse range of students in a typical class, provide teachers with regular feedback of how their students are tracking and also increase student engagement both in and outside of class. Beyond the amazing features listed above the homework sheets are 100% free!

D46 Humans controlling machines

Y8 - 11, Workshop

Anthony Harradine, Potts-Baker Institute, Prince Alfred College, SA

Coding is fun - right??? :) Well, not always. But it seems to be becoming more important for a greater number of people. Come along and see how very simple code can be both satisfying and provide a unique introduction to important mathematical ideas that are in the curriculum. No prior skill required. Activities tried and proven.

D47 Communicating reasoning with digital technology

Y3 - 6, Repeat, Workshop

Esther Loong, Deakin University

Emma Fawcett, Rolling Hills Primary School

Being able to communicate reasoning is a key aspect to the development of this proficiency in students. In this workshop, teachers have the opportunity to view how digital technology can be used to assist students' thinking and ability to communicate their reasoning. The presenters will share their experience on how suitable iPad apps for particular topics can be used by teachers to help students analyse and communicate their conjectures. Participants will be able to view video clips and photos of students at work with these apps.

D48 Cloud-based planning, tracking and reporting for easy differentiation in today's classrooms

Y6 - 12, VCAL, Commercial, Repeat, Workshop
Bill Murray, Mentone Girls Secondary College and Victoria Pichler

The cloud-based Classroom Organiser enables teachers to prepare every individual lesson plan required for the year and to track student progress shortly after lesson completion. Student assessments can be transferred to students and parents (using separate log-ins) within a few days of test completion. The system enhances student self-paced learning and encourages students to work through various levels of achievement. The system helps teachers to differentiate to meet individual student needs for consolidation or extension. The planning and tracking is easy to organise and data can be imported or exported in standard formats to suit existing systems.

SESSION D-E, Thursday, 2.30pm-4.20pm

D-E1 Coding tasks for middle school mathematics

Y9 - 10, Double/Repeat
David Tynan, Aquinas College

In this workshop we will look at some examples of how coding can be incorporated into middle school mathematic topics.

SESSION E, Thursday, 3.40pm-4.40pm

E1 Prepping for Foundation: the best start – transitioning students from Kinder to Foundation

F - 1, Repeat, Workshop
Bree Collins, Windsor Primary School

It's first day 2018, and the new Foundation students are just walking through the door. What skills and maths knowledge do they bring from Kinder in their backpack? How should teachers fill gaps in knowledge? And what does Foundation mathematics look like in Semester 1? This workshop explores transitioning from Kinder to Foundation and will provide hands on examples of the way to structure a mathematics program during Semester 1. We will explore research into assessment practices to inform a Foundation teacher and how best to include families to capitalise on relationships to support student learning. Let's give them the best start!

E2 Maths in the mulch: real-life learning through a kitchen garden program

F - 10, Repeat, Lecture
Rebecca Naylor and Stephanie Davies, Stephanie Alexander Kitchen Garden Foundation

This session explores what excellence in mathematics teaching looks like through a hands-on approach informed by real-world kitchen and garden contexts. Kitchen garden schools in Years F-10 across the country are already using real-world spaces for students to learn all kinds of maths through growing, harvesting, preparing and sharing their own fresh, delicious food, and they're loving every minute of it. Learn how to engage a mathematical mindset and grow a healthy approach to learning maths through real-life examples and a unique approach that underpins the curriculum and offers students diverse learning opportunities and experiences.

E3 Give probability a chance

F - 12, Workshop
Doug Williams

A mathematician's work begins with an interesting problem. School maths is about learning to work like a mathematician, so, in the context of probability, this workshop will begin with a problem; one that appears almost too simple to bother with. We will explore it in depth and consider the pedagogy likely to encourage students K - 12 to be interested in it. The session will point out other probability investigations offering similar opportunities to fascinate, captivate and absorb students.

E4 MAV-Maths Talent Quest (MTQ)

F - 12, Workshop
June Penney, Bacchus Marsh Primary
Jenny Dockeary, Melton South Primary School

The Maths Talent Quest continues to be a highlight of the MAV Student Activities events. Running for over 30 years, growing in participation and overall quality of results year by year. MTQ involves students engaging in personally chosen 'real life' math investigations. The categories include all primary and secondary year levels, either individual, group or class. Certificates and prizes are awarded at a presentation ceremony, some investigations are selected to represent Victoria in the National MTQ. Interested in the MTQ and how to incorporate it into your class/school program? Do you have a personal interest or have questions about coordinating this at your school? Join us to discuss criteria, process and timelines, to share ideas and to view past investigation examples.

E5 Improving students' outcomes through the use of assessment diagnostics

F - 12, VCAL, Commercial/Repeat, Lecture
Alexander Young, Ingenious Technological Enterprises TAS

The author collaborated with schools in three states to develop a 'world first' means for teachers to monitor the quality of their teaching using 'assessment for learning'. This has enabled teachers to 'change their lives and that of their students', or as a speaker at the ACEL 2012 conference put it; 'The students in her school, on average, learn at twice the pace of the nation and at twice the usual depth'. The author has found a large proportion of schools' NAPLAN results appear to be 'flat lining' whereas licensees' NAPLAN results are improving, year on year.

E6 The essential elements of lessons that include all students in building understanding, solving problems and reasoning mathematically

F - 6, Lecture
Peter Sullivan, Monash University

There is widespread agreement that student driven inquiry approaches can assist students in building understanding, solving problems and reasoning mathematically. But to ensure that all students are included in the learning opportunities, specific teacher actions are needed and lessons can best be structured in particular ways. This session uses examples of challenging mathematics learning experiences to illustrate the key elements of such teacher actions and mathematics lessons.

E7 It's called number AND ALGEBRA: algorithmic thinking across primary years

F - 6, Repeat, Workshop

Tim Colman, Windsor Primary School

Algorithmic thinking provides opportunities for students to follow and create a well-defined set of instructions to perform a task or solve a problem. We often focus purely on numbers, without linking algebraic problem solving skills. Promoting algebraic thinking encourages and increases students' ability to solve problems using different strategies. This workshop will outline a series of ten lessons from Foundation to Year 6 that challenge students with the opportunity to explore algorithmic thinking. These lessons have been successfully used in classrooms, and are available online with enabling and extending prompts. Come and explore why algebra is much more than just x and y !

E8 Eliciting student mathematical reasoning

F - 6, Repeat, Workshop

Jennifer Churcher and Wanty Widjaja, Deakin University

Engaging students in justifying, forming conjectures and generalising is critical to develop their mathematical reasoning. Teachers' probing questions are critical in developing students' capacity to form and test conjectures. In this workshop participants will have the opportunity to examine evidence from children's written explanations and their verbal explanations captured in the video clips. The presenter will share her experience in eliciting, responding and extending student mathematical reasoning.

E9 Getting creative with maths and growth mindsets

F - 6, Repeat, Workshop

Rebecca Harris, Dandenong Primary School

Children are born into the world with an innate sense of number, curiosity to explore patterns and problem solve, and the instinct to persist with challenges. Yet we as educators see this dwindle away as students learn to accept they are not good at mathematics. What implications does this have for our teaching practice? Explore research behind growth mindsets, and develop ideas and strategies to connect students to mathematics through art and creativity. Reignite the fire with colleagues, who themselves, see mathematics as a challenge. Foster skills to build dialogue and reasoning strategies amongst students through visual artistic ideas.

E10 Incorporating the proficiencies - focussing on BIG IDEAS

F - 9, Lecture

Dianne Siemon, RMIT University

This workshop will explore a planning tool that incorporates the proficiencies, provides multiple opportunities to revisit key ideas and strategies, and values targeted teaching and inquiry-based approaches to the teaching and learning of mathematics while ensuring an unrelenting focus on the big ideas that make a difference.

E11 Mathematics is a fun activity with folding paper

F - 9, Repeat, Workshop

Karim Noura, Bayside P-12 College

In this workshop, teachers will have the opportunity to explore and visualise problem solving situations with folding paper. It will be also an opportunity to share ideas and experiences of teaching mathematics with hands-on activities.

E12 MAV VCAL book resources

Y11 - 12, Workshop

James Gray, Peter Lalor Secondary College

This session looks at how VCAL teachers can take information from resource books and apply it in their classrooms. Each of the VCAL strands will be explored through a hands-on activity, taken from a variety of text-based resources. As well, the tasks will look at the three VCAL numeracy levels of Foundation, Intermediate and Senior.

E13 Worthwhile CAS calculator use in this year's second Methods exam?

Y10 - 12, Workshop

Kevin McMenamin, Mentone Grammar

Routine and clever use of the CAS calculator in past Methods 2 examinations has shown it to be advantageous and worth the time and effort in getting to know its workings. Generally, half of the multiple choice questions and many parts of the extended answer questions benefit from good calculator skills. This hands-on session will get you using the calculator to see just how helpful (or not) it was with this year's questions. The most efficient methods will be presented and questions where the calculator should be avoided will be pointed out. The session is suitable for TI-Nspire and ClassPad users and the Casio ClassPad will be the featured CAS.

SESSION E, Thursday, 3.40pm-4.40pm (cont.)

E14 ClassPad excellence for upper school students

Y10 -12, Repeat, Lecture

Charlie Watson, The Tuition Centre, WA

How does excellence in the math classroom or exam hall arise in the use of ClassPad? This hands-on workshop is designed for teachers who want to develop excellence, build their skills and pick up tips and tricks with ClassPad that will be useful for them and their students in Further, Methods and Specialist classes. We will hop between courses and applications. A reasonable working knowledge of ClassPad will be assumed for the hands-on part, but if that's not you, just come along, sit back and see what's possible.

E15 Teaching sampling and inference using data cards

Y11 - 12, Workshop

Shane Dye and Nicola Petty, Statistics Learning Centre, New Zealand

One of the BIG ideas in statistics is that we can use a sample to draw inference about the population. This workshop presents a series of lessons to teach this concept in an active, engaging way using data cards. In this hands-on workshop we will experience highlights of the lessons as well as lessons about types of sampling and the effect of sample size.

E16 Helping students navigate the labyrinth of mathematical symbols

Y2 - 12, Lecture

Kin Eng Chin and Caroline Bardini MGSE, The University of Melbourne

Students need to be confident in using symbols so that they can grasp the mathematical language in a flexible way. To gain this confidence they need to understand that the meaning of familiar symbols may depend on context. Even the familiar \times can seem to change meaning as we move from whole numbers to fractions or from numbers to matrices and vectors. Along their mathematical journey earlier learning can sometimes be supportive and sometimes problematic. In this session we'll explore some examples and look at how teachers can help students to find their way at each new stage.

E17 Mathematics and the Commonwealth Games

Y2 - 7, Repeat, Workshop

Pamela Hammond

The theme of 'Mindsets' includes the desire to promote that maths is fun, everyone can do it and its value in society. Embedding school mathematics in relevant and engaging

contexts is one way of achieving this. The Commonwealth Games provides an ideal opportunity for students to experience the use of mathematics content that they are learning to an event beyond the classroom in sporting and other contexts, as well as making connections across the curriculum. This hands-on workshop will engage participants in aspects of mathematics and the proficiencies that can be included as part of a program focusing on the Commonwealth Games.

E18 What does excellence in MATHS look like? It is all about relationships and communication

Y3 - 10, Repeat, Lecture

Michael O'Connor, AMSI

Mathematics is the study of relationships. Teaching and learning have as their foundation the relationship between teacher and student. So learning mathematics well relies doubly on relationships. To teach mathematics well also requires excellent communication skills. The primary indicator for this is how well the students understand what we say. This session is a reflection on thirty years of involvement with teaching and learning mathematics; in the classroom, individual tutoring and most recently managing AMSI's Schools Outreach Team. It will include a combination of advice and insights garnered from sources and will include examples from multiplication and algebra.

E19 Promoting long-term learning progress and the ACER Certificates

Y3 - 12, Commercial, Lecture

Karen Sturzaker, ACER

In his recent paper, Promoting long-term learning progress, Professor Geoff Masters asks the question: How well do we help students recognise and reflect on the long-term progress they make at school? Masters contrasts the approach taken by programs such as the Australian Music Education Board (AMEB) exams and the Suzuki method with traditional education where students are grouped according to their age and delivered a curriculum designed for a particular grade level. Like the AMEB and Suzuki method, a new program developed by the Australian Council for Educational Research, the ACER Certificates in Mathematics, provides a sequence of well described achievement levels in mathematics which make explicit what it means to make long-term learning progress. The accompanying graded assessments and accompanying certificates are not linked to age or grade levels but rather to the learning progression, and students are able to attempt a certificate which provides a meaningful but realistic challenge for each individual.

E20 How do I...? A Q&A with the Mathspace team

Y3 - 12, VCAL, Commercial, Workshop
Paul Fielding and Joe Wilson, Mathspace

This session is for Mathspace users who would like to learn more about how to use Mathspace more effectively and keep updated with any new features. We want to hear from our teacher users and we would love to answer your questions. From the simple 'how do I...' to the 'have you considered this feature', this is the chance for us all to get together to discuss the evolving platform that is Mathspace. Share your thoughts and ideas with teachers from other schools, and hear more about how different schools are using Mathspace.

E21 What the PONT? A targeted teaching tale

Y3 - 6, Repeat, Workshop
Ben Allen and Chantelle Polkinghorne, Ringwood North Primary School

We have designed a new program at Ringwood North Primary School that allows us to use assessment data in new ways. Across our senior school classrooms, we have assigned curriculum areas for each teacher and students move in fluid groups to target areas of need, then be extended. Using technology, hands on materials and teaching our students a new program, we have found huge growth in mathematical knowledge.

E22 Number genetics

Y4 - 10, Repeat, Lecture
Mike Clapper, AMT

Every whole number has a unique 'genetic' code based on its prime factors. Whilst prime factorisation is a part of the curriculum, many of the properties which arise from it are not explored, to the detriment of students developing a 'feel for numbers'. This talk will present a number of these properties and some problems which can be solved by a deeper understanding of prime factors of numbers, along with many ideas for student investigations.

E23 A numeracy intervention program achieving outstanding growth

Y4 - 10, VCAL, Repeat/Commercial, Lecture
Michelle Anderson and Helen Barker, Numurkah Secondary College

Numurkah Secondary College is in its third year of the Quicksmart Numeracy program achieving growth rates in excess of 2.5 times their peers. The Quicksmart program

works on fluency of basic operation to free up working memory for high order operations by improving the students information retrieval times. We are seeing a defiant closing of the gap between our top students and those in the 'forgotten' middle third of our cohort.

E24 Lessons in financial literacy

Y4 - 6, Repeat, Workshop
Carly Sawatzki, Monash University

This workshop aims to excite teachers about the possibilities the Victorian Curriculum brings while modelling what 'real world' teaching and learning looks and feels like. Drawing on innovative money and financial mathematics tasks, this session will explore the potential to connect learning areas and capabilities, while asking participants to sensitively consider social justice issues. Particular task design principles will be highlighted so that teachers might feel encouraged to develop tasks that fit their students' learning needs and interests.

E25 Forming hypothesis – data collections and using online free Google Apps

Y5 - 12, VCAL, Repeat, Computer workshop
Iqbal Hossain, The Grange P-12 College
Fahmida Hossain, Scholarship Assessment Training

This session will focus on how students frame a hypothesis on a contemporary issues and collect primary and secondary data, then compare their findings vs hypothesis. Students prepare and run survey to collect data. Part of the discussion will cover some key points in designing surveys. This will include the use Google Apps (Google Form – run online survey and analyse survey result; Google Slides – create and edit online free presentation). Finally, how students manipulate this data to support interpretation and apply computational skills to analyse the data and derive a conclusion, will be shown using different work examples.

E26 Simple solar instruments

Y5 - 8, Workshop
Tim Byrne

In this workshop, participants make simple solar instruments without moving parts that have worked for millennia. This workshop helps participants create instruments which mark the passing hours and minutes (an equatorial sundial), an instrument which monitors the apparent passage of the sun across the sky and an instrument for safely measuring the altitude of the sun (Ptolemy's Plinth). Participants will be

SESSION E, Thursday, 3.40pm-4.40pm (cont.)

invited to consider the relevant mathematics underlying the measurement of time and the geometry of simple daytime astronomy. This workshop will appeal to participants looking for a practical hands on, visually appealing, mathematics rich task.

E27 Integrating algorithms and coding into the mathematics classroom

Y7, Repeat, Lecture

Chris Paragreen and Bernie McGrath

This presentation looks at the approach Kew High School has taken to incorporate algorithms and coding into several of the Year 7 units this year. Our approach aims to embed realistic and relevant applications of algorithms and coding without the need to add new units to the crowded mathematics curriculum. It also ties in with STEM education principles. You will gain access to the resources we have developed so that you may adapt them to your own classrooms. Time will also be made available to discuss strategies adopted at other schools, together with the pros and cons of different approaches.

E28 Scratch mathematics (make your own CAS Calculator)

Y7 - 10, Workshop

Sanjin Dedic, Techxellent

Every single pixel on your computer screen is co-ordinate on a Cartesian plane and the program displaying the image in front of users is using both arithmetic and algebra (variables). In this workshop we will use Scratch an easy to use block based programming language to solve equations, plot linear and quadratic curves, find XY intercepts and intersection points of curves. This activity which requires no prior programming experience will give your students a new perspective on algebra and co-ordinate geometry.

E29 The big data classroom: scanning the world

Y7 - 10, Workshop

Eugene Roizman, Box Hill High School

With the increasing availability of big public datasets, an interdisciplinary data science approach, offers a way for students to engage with an authentic and complex issue, organically developing a number of core 21st century skills in computational thinking, teamwork and communication. This session will trace the deployment of a data science approach in a Year 10 (accelerated) context using IPython Notebook, provide teachers with differentiated units of work, and explore the potential of integrating data science across a variety of year levels. Participants are encouraged to bring their laptops to explore some of the tools and datasets available to students.



E30 Promoting and assessing creativity and critical thinking

Y7 - 10, Workshop

Geetha James, Caulfield Grammar School

The aim of this presentation is to provide teachers with resources and strategy that allow students to • review material from past years • trigger prior knowledge for an upcoming problem • inspire construction of new knowledge • introduce new terminology • practise new skills • see new ideas from different representations • introduce new technology skills • make an abstract concept more concrete • challenge more able students. While most students will not exhibit all of the skills and habits listed above, every student will experience and exhibit some of them.

E31 Algorithmic thinking and programming with Python

Y7 - 10, Workshop

Nat Bradshaw, Lowther Hall Anglican Grammar

Python is a programming language that can be used to solve many different types of problems. It is also the language used to program social media platforms such as Youtube and Pinterest. In this workshop participants will be introduced to algorithmic thinking and programming with Python and work through a range of introductory problems for the classroom.

E32 Solution based resources – the problem with problems

Y7 - 10, Commercial/Repeat, Lecture

Caitlin Mahony

Why do we have to learn this? Explore a research-based approach to creating mathematics teaching resources for students and teachers that generate enthusiasm to delve deeply into real-life maths. Caitlin discusses an alternative to textbooks that builds up student interest and confidence whilst giving them the conceptual mathematical tools to become not 'problem solvers' but 'solution creators'. You will walk away with a new toolkit of resource creation techniques, a solution to the 'problem' problem, and if you ask nicely you might even get some amazing resources for free!

E33 Coding and STEM with Pearson Mathematics 2nd Edition

Y7 - 10, Commercial, Computer workshop
Tim Carruthers, Julian Lumb and Daniel Hernandez,
Pearson

Incorporating algorithms and coding into your mathematics teaching can be intimidating. In this session you will get to play with Pearson's Exploration Coding platform, a set of web-based activities designed to develop algorithmic thinking and reasoning skills within a coding environment, following the Victorian Curriculum requirements. You will also see how content such as Pearson Mathematics STEM explorations and teacher support can be used to integrate STEM content into the classroom.

E34 Mathematica for the Victorian Curriculum

Y7 - 10, Repeat, Computer Workshop
David Leigh-Lancaster, VCAA

In this session we explore Mathematica functionality across the three strands of the Victorian Curriculum Mathematics F-10 using prepared notebook files. Participants will need to bring their own laptop with Mathematica loaded and activated. A 15 day free trial can be accessed from <https://www.wolfram.com/mathematica/trial/>. Victorian secondary teachers can access Mathematica for free from DET.

E35 7 things I wish I had known 25 years ago

Y7 - 12, Repeat, Lecture
Peter Collins, Dandenong High School

The presenter is an experienced teacher of maths in the Victorian state system. In the years since finishing college, he has found out a number of useful things / techniques that have made things a lot easier. This presentation will ideally suit new teachers to maths and anyone open to new ideas.

E36 All tangled up

Y7 - 12, Workshop
Amie Albrecht, University of South Australia

This workshop will focus on the rich problem called 'Conway's Rational Tangles' which has surprising connections to mathematics from primary classrooms to university level. We'll tangle up two ropes using only two kinds of moves: twist and rotate. Is it possible to untangle the ropes using only these moves? This is a hands-on problem-solving workshop full of critical thinking, creativity, and doing maths. The excitement when students work it out for themselves is exhilarating. Resist the urge to Google it, and come and discover for yourself. Be prepared for lots of tangles, both physically and mentally!

E37 CASIO education resources – a guided tour

Y7 - 12, Repeat, Lecture
Alastair Lupton, Le Fevre High School South Australia

The Casio Education website has had something of a makeover recently. It has a surprising amount of high quality resources, some on technology, some on teaching mathematics, and some on teaching mathematics with technology. It is a treasure trove! Come along for a guided tour.

E38 Harry Houdini and maths

Y9 - 11, Repeat, Workshop
Chris Ireson

Learn how to perform a simple magic trick to inspire your students and then build a project based on the outcome of the trick and more. Bring along your TI-Nspire CAS Calculator to write User Defined Functions and use the Notes Page to make a unique project for each student.

SESSION E, Thursday, 3.40pm-4.40pm (cont.)

E41 Modelling motion: putting mathematics into middle years STEM activities

Y5 - 8, Workshop

Susie Groves and Brian Doig, Deakin University

Modelling motion is a special topic in the Australian Academy of Science/Australian Association of Mathematics Teachers funded reSolve: Maths by Inquiry project. This inquiry based unit comprises eight activities focussing on modelling a variety of different motions with mathematics, using contexts include such as rolling balls and falling objects. Students experience the power of mathematics in STEM activities and build their mathematical modelling skills. This workshop will provide an overview of the unit and give participants hands-on experience with materials and activities.

E42 Numeracy picture book libraries with linked lessons

F - 6, Repeat, Commercial, Workshop

Anna Kapnoullas, Top Ten Resources

Literacy or maths? Why choose when you can do both using a numeracy picture book library! The Top Ten team of maths leaders has selectively chosen the best 75 picture story books to introduce and hook students into maths. We have created 250 comprehensive lesson plans directly linked to these mathematical picture stories and aligned to the Victorian Curriculum. Each linked lesson has detailed teacher

modelling, photographs of learning in action, student work samples, extension and support differentiation options, as well as higher-order questioning prompts. This presentation will showcase five picture books and their linked lessons.

All lessons use hands-on materials to bring to life the maths from stories! Our catalogue easily navigates teachers to the best-suited picture stories for their year level and specific maths concepts throughout the year. All participants will receive more than 15 detailed lesson plans as examples of learning designs linked to numeracy picture stories to share with their teams and help implement a school-wide practice of using stories to launch maths lessons. More information is available at www.toptenresources.com.

E43 Maths games for Maths Games Days

Y5 - 8, Workshop

Helen Haralambous, MAV

The MAV Games Days are very popular and a great way of engaging students through competing with like-minded individuals. The MAV gets many enquiries from schools wishing to run smaller scale Games Days at a local level. The games are also a useful tool in engaging all students. In this hands on workshop participants will trial a selection of games and activities.

E44 Using challenging and consolidating tasks to improve mathematical fluency

All levels, Lecture

Sarah Hopkins and James Russo, Monash University

Research indicates that over one-quarter of Australian students entering high school are still reliant on counting-based strategies to solve simple addition problems. To address this issue, we propose that challenging tasks should be used in conjunction with problem-based practice to improve mathematical fluency. We explore how work on challenging tasks can help to build conceptual understanding, as well as provide meaningful incentives for students to begin experimenting with partitioning-type strategies. However, we argue that it is critical that students are provided with parallel opportunities to work on consolidating tasks, in order to connect this conceptual understanding to improved strategy efficiency.



**SESSION
DETAILS:
FRIDAY
8 DECEMBER**

SESSION F, KEYNOTE, Friday, 9am-10am

F1 Targeting student understanding

Primary

Sarah Ferguson, Clairvaux Catholic School

This keynote will examine pedagogy that builds student understanding of the key concepts in mathematics.

F2 The International Lexicon Project: Giving a name to what we do

Secondary

David Clarke and Carmel Mesiti, The University of Melbourne

David and Carmel's presentation will report the characteristics, structure and distinctive features of the Australian Lexicon and illustrate these with specific examples.

F3 How, what and why I think about maths

All levels

Norman Do, Monash University

When telling a typical person that I love maths and I do it for most of my days they usually ask questions like how, what and why. Today we will answer these questions and discuss some cool maths, see its beauty first hand and find out exactly what maths is good for.

F4 Pure mathematics

All levels

Dan Finkel, Maths for Love

Students often get lost in the abstraction and technicalities of mathematics. Interestingly, we can remove technical barriers while making problems richer by introducing physical manipulatives into our classrooms, even as we study pure (i.e. unapplied) topics like fractions, proportion, algebra, and geometry.

F5 Success in tertiary education requires maths!

All levels

Trish Jelbart and Nicole Merlich, Victoria University

This presentation will outline the Maths that students require and discuss how students are assisted in TAFE and University to obtain the skills required.

F6 Assessing young children's mathematical strengths

Early years

Amy MacDonald, Charles Sturt University

This keynote presentation will explore a range of research-based and practically-relevant approaches for recognising, and building upon, young children's mathematical experiences and understandings.

For full abstracts of keynotes, see page 8.

SESSION G, Friday, 11am-12pm

G1 Big ideas for young minds

Foundation, Workshop, Repeat
Brian Doig, Deakin University

The Russian psychologist, Davydov, in the spirit of Vygotskii, theorized and experimented with young children learning mathematics through play to develop problem solving skills. This work was based on play with materials with the characteristics of length, mass, area, and volume. Following this example, we will look at how the prior-to-school educator can build children's early mathematical experiences using common materials and lots of language. This approach builds solid concepts for measurement, and while not claiming that we can achieve the same as Davydov's Russian children, we can at least explore the possibilities of a better start to mathematics.

G2 The mathematical world of Indigenous Australians

F - 10, Lecture, Repeat/Commercial
Andrew Crisp, Mathspace

Mathematics is truly universal; at the same time, the way an individual thinks and communicates mathematically is deeply embedded in the social practices and culture in which they are raised. Early attempts by Western thinkers to understand the mathematics of Indigenous Australians (and other Indigenous groups around the world) were influenced by a cultural narrative of Western superiority that lingers to the present day. This talk explores the unique insights that can be gained by a more inclusive (and accurate!) view of Indigenous Ethnomathematics, in both the mathematical and cultural realms, and how to bring these ideas to life in your classroom.

G3 Mathletics - what's new?

F - 10, Computer Workshop, Commercial/Repeat
Lauren Anderson and Tom Beardsworth

This session will explore the new primary and secondary Mathletics teacher and student interface. We will demonstrate the use of Mathletics to cater for student driven learning and teacher led instruction. We will also discuss ways to use Mathletics to support data driven teaching and learning, as well as using Mathletics as an assessment tool to inform teaching and planning.

G4 Linking part-part-whole knowledge with multiplicative strategies

F - 12, VCAL, Lecture
Dheepika Rathana Kumar, RMIT Bundoora

This session shows the importance of introducing the concept of part-part-whole knowledge to children at a young age with simple card games and how this benefits students in later primary and secondary maths. This presentation focuses on how part - part - whole links with multiplication strategies such as 'Doubles and 1 more group (threes facts)', 'Double, doubles (fours facts)', 'Same as (ones and zero facts)', 'Relate to ten (fives and nines facts)' and 'Rename number of groups (remaining facts)' helping students to think out of the box. Some advance part- part-whole questionnaires have been created to cater for high-achievers in the Years 3- 6 classrooms and will be shared during this session.

G5 Tip of the iceberg - how to find the best rich tasks for your teaching context

F - 6, Workshop, Repeat
Jennifer Bowden, MAV
Nadia Walker, Benton's Junior College

In this workshop, we will share our favourite resources in choosing effective rich tasks. Based on our own research, coaching and classroom teaching experience we will explore Victorian teachers' criteria for choosing rich tasks used in their classroom. We will share tips and ideas in developing your own rich tasks to allow for effective differentiation, authentic and engaging activities. Rich tasks are often the most effective way to assess students learning and inform planning against content strands and the proficiencies. We will complete and analyse a rich task and develop it to suit your teaching and learning context.

G6 From closed to open - differentiated investigations allowing students to become proficient mathematical learners

F - 6, Workshop, Repeat
Brendan Hodge, Lang Lang Primary School
Karyn Thomas, Wonthaggi Primary School/Lang Lang Primary School and Kristy Miller, Woodlands Primary School

Opening up closed activities to not only explicitly teach skills but to cater for problem solving, thinking, reasoning, and communication. Rich open investigations that all students can access with multiple entry and exit points. Exploring the role of the teacher and students during an open investigation.

SESSION G, Friday, 11am-12pm (cont.)

G8 Eliciting student mathematical reasoning

F - 6, Workshop, Repeat

Jennifer Churcher and Wanty Widjaja, Deakin University

Engaging students in justifying, forming conjectures and generalising is critical to develop their mathematical reasoning. Teachers' probing questions are critical in developing students' capacity to form and test conjectures. In this workshop participants will have the opportunity to examine evidence from children's written explanations and their verbal explanations captured in the video clips. The presenters will share their experiences in eliciting, responding and extending student mathematical reasoning.

G9 What is it really like in a Finnish school?

F - 7, Workshop

Trish Jelbart, Victoria University

Finland has been known for its excellence in education for many years now, and there is much speculation and some misinformation about the schooling system. This session will present what goes on in a typical Finnish primary school over the course of 2 days, with a focus on mathematics and within the context of broader discussions about similarities and differences to Australian primary school education. The content should be interesting to all teachers who are interested in the big picture of education. The particular school in focus also has 2 'Finnish as an Additional Language' classes, where refugees and migrants spend a year before entering the mainstream classes for their age group.

G10 Why choose maths?

F - Adult, Lecture,

Janine McIntosh, AMSI

The mathematics pipeline, from early childhood, through school and into the workplace, suffers from blockages that have the effect of reducing public perception of mathematics as a beautiful and useful tool as well as decreasing the number of people participating in the world in a mathematical way. Choose Maths, delivered by AMSI, is a national program designed to support teachers and help students and their parents see where maths can take them. In this session, tips from our research for your classroom and teaching resources for primary and secondary teachers will be shared. What made you choose maths?

G12 Excelling with eActivities for ClassPad in the upper school

Y10 - 12, Lecture, Repeat

Charlie Watson, The Tuition Centre, WA

Customised eActivities on a ClassPad can offer students considerable time savings when dealing with many types of math problems. The diverse range of applications that can be created and stored in an eActivity is often overlooked by many teachers, from dealing with simple formulas to coding open programs. The aim of this workshop is to share and demonstrate some existing types of eActivities and then for participants to develop their own skills in creating and using eActivities. A reasonable working knowledge of ClassPad will be assumed for the hands-on part, but if that's not you, just come along, sit back and see what's possible.

G13 Further Maths examinations 1 and 2: advantageous use of the CAS calculator

Y10 - 12, Workshop

Kevin McMenamin, Mentone Grammar

This session will look at questions from this year's papers and discuss how useful applications of the CAS calculator aided in finding many answers. The use of pre-programmed material and ways information assisting calculator functionality could be recorded in the bound reference will be addressed. The session offers a hands-on experience that will give you the opportunity to use the calculator just like the students. The session is open to TI-Nspire and ClassPad users and the featured calculator will be the Casio ClassPad

G14 The Bisection Method and Newton's Method

Y11 - 12, Lecture, Repeat

Brian Stokes, Monash University

In the current VCE Mathematics Study Design (2016 - 2018) for the subject Mathematical Methods, additional algebra material has been added as follows: Numerical approximation of roots of simple polynomial functions using the Bisection Method and numerical approximation of roots of cubic polynomial functions using Newton's Method. The purpose of this presentation is to discuss these two methods and to illustrate their application with examples. In addition, exercises will also be provided together with their solutions.

G15 Get your hands on hands-on tasks

Y2 - 10, Workshop

Doug Williams

In March 1977 the first hands-on problem solving task centre opened. It was created by Neville de Mestre and Bea Duncan at Campbell Primary School, ACT. Since then tasks have always been part of mathematics learning in schools somewhere in Australia. Many, many teachers have contributed to the extensive support - from creating tasks to assessing learning - which is available through Mathematics Centre. In 2017 Mathematics Centre introduced eTasks, which provide everything you need to make your own tasks from your own materials. Find out why you might bother, how easy it is to do and how the process can be the focus of in-house professional development.

G17 What mathematicians do - encouraging engagement in primary maths

Y2 - 6, Workshop

Shane Dye and Nicola Petty, Statistics Learning Centre, New Zealand

Teachers need to experience the fun and possibilities of being a mathematician. This workshop lets teachers participate in their version of an event for students. Participants will practise being mathematicians and develop teaching practices for rich lessons. The workshop builds on successful free events at primary schools in rural New Zealand and provides tools for teachers to run similar engaging lessons.

G18 Exploring depth. What if????

Y2 - 6, Workshop

Catherine Epstein, MAV

Are we asking our students to think, estimate, consider options, discuss strategies, analyse findings and confirm proofs or just to calculate? We need to get our students to delve deeper to unpack problems through proof and reasoning especially when working with a curriculum that encourages computational thinking. In this hands on workshop we will investigate a few rich tasks and games that encourage the students to delve deeper and choose efficient strategies to solve problems through reasoning and proof. We can then ask... what if?? Where can I take it from here?

SESSION G, Friday, 11am-12pm (cont.)

G19 Mind your language! Teaching mathematical vocabulary so it sticks

Y2 - 8, Workshop, Commercial
Andrew Lorimer-Derham, St Mary's Primary School

Getting lost overseas isn't much fun, especially when you can't read the signs or speak the language! For a lot of students, solving maths problems feels much the same. The good news is we can do something about it. In this session, you'll be shown a range of hands-on activities to provide a meaningful context for the use and repetition of mathematical terms. Learning by immersion is the fastest, most natural way to understand language, so let's make use of it by immersing our students in the world of mathematics.

G22 Using formative feedback – make it useful, make it quick!

Y4 - 12, Lecture
Suzy Pask, OLSH College

How do you use assessment FOR learning during a topic? What do you do with that data? In this session I will demonstrate a strategy which informs the teaching that happens next. Use the data collected to enhance the learning of the students in your classroom. EXCEL is used to collate results into a quick visual representation which can then be used to re-teach, extend, enhance the individual or class. Let this strategy inform your next lesson.

G23 Developing good questions to reveal and guide fractional thinking

Y4 - 8, Workshop, Repeat
Catherine Pearn, Max Stephens and Robyn Pierce, Melbourne Graduate School of Education, The University of Melbourne

Fractional thinking with its interconnected constructs is key to understanding number and multiplicative thinking. Identifying students' thinking and choosing questions to develop understanding and proficiency is a challenge for teachers. This paper examines the results of six tasks completed by 570 middle years' students from Victorian schools. These tasks, administered as part of a Fraction Screening Test, not only reveal students' thinking but also provide examples for teachers of the type of questions that will guide students forward in their thinking. In particular, questions that prompt 'reverse thinking' are often overlooked but are powerful in challenging students to generalise.

G25 Using teamwork to motivate students

Y5 - 10, Workshop, Repeat
Joe Wright, Joanna Tutos and Paul Wright, The Educational Advantage

Human competitiveness is a natural driver for most of us, and working in a team harnesses that drive in a non-threatening way. Achieving a goal as part of a team is a rewarding experience. Encouraged by teammates, we become more engaged in an activity, and as a result we learn more efficiently. Interestingly, the ability to work in a team is a powerful predictor for success in the workplace. Join us as we share some practical ideas that use teamwork to promote the growth of the group, but also allow for recognition of individual contributions. Bring a laptop or a tablet.

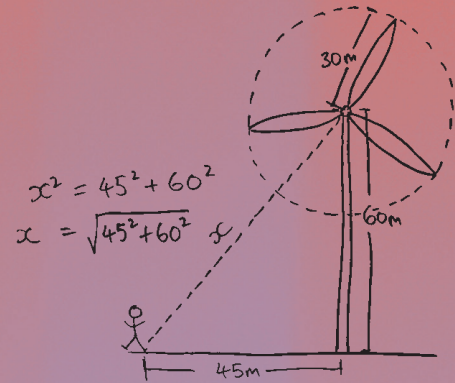
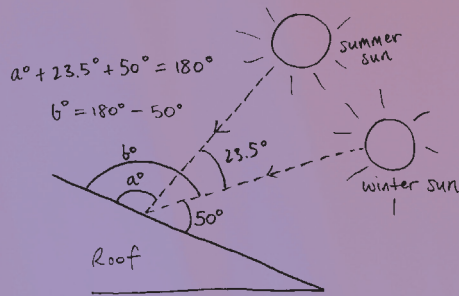
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Day	Max. wind speed (km/h)
1	50
2	55
3	41
4	42
5	30
6	32
7	30
Total	280
Mean	$= \frac{280}{7} = 40 \text{ km/h}$

$$\begin{aligned} \text{Area} &= \pi r^2 \\ &= \pi \times 30^2 \\ &= 2826 \text{ m}^2 \end{aligned}$$

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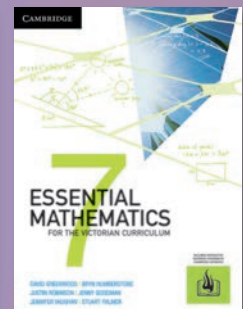
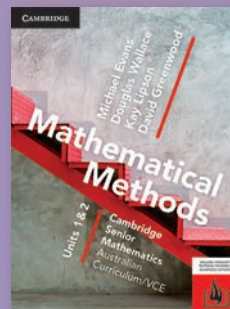
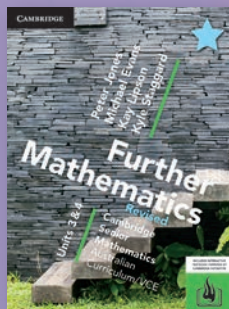
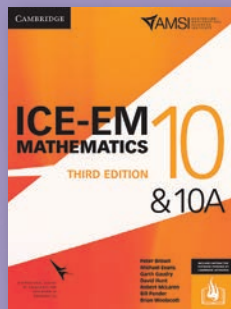
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SESSION G, Friday, 11am-12pm (cont.)

G26 Algebra - the story continues

Y5 - 10, Lecture, Repeat
Mike Clapper, AMT

This presentation continues from the 2013 presentation 'Algebra as story-telling' (also published in conference proceedings). It develops the narrative approach to the teaching of algebra to provide an engaging and empowering experience for students. Examples and resources will be provided.

G27 Hanlon's handy hints

Y5 - 11, Workshop, Repeat
Stephen Hanlon, Braemar College

This practical workshop is a collection of short mathematical tricks that can easily be used with your classes either as a warm-up activity or to initiate a topic, to motivate or spark an interest, or just simply to entertain and bemuse. There is something here for everyone from the graduate teacher to the seasoned campaigner. A similar presentation in 2013 was well received; 'This will be really helpful. Can't wait to stun my class on Monday' - Cathy.

G31 Proofs, patterns and geometry - a new Year 10 mathematics option at Camberwell High School

Y7 - 12, Lecture, Repeat
Geoffrey Menon and Ursula Parker,
Camberwell High School

Since 2016 Camberwell High School has offered an optional mathematics program that allows interested students to explore foundational mathematics in more depth, collaborate in problem solving, to present the findings of their own mathematical investigations and review the work of others with a goal of improving each others work. This presentation will cover implementation, planning and how this new subject has been received by students, staff and the CHS community.

G33 Mindfulness in the secondary school classroom

Y7 - 12, Workshop, Repeat
Elizabeth Shepherd, Canterbury Girls' Secondary College

Mindfulness is more than a passing fad. When students are truly present they are better able to learn and achieve their potential. Students who are anxious, depressed or struggle to engage in the classroom may benefit from learning to practice mindfulness. This presentation describes MEd research into the use of mindfulness in an independent secondary school. The case study investigates experiences of the school leadership, staff and students- teaching, learning and using mindfulness. Additionally the presenter, a current maths/science teacher, will discuss introducing mindfulness into the curriculum at her secondary school in Melbourne. Mindfulness activities will be included.

G34 Critical and creative thinking in the maths classroom

Y7 - 12, Workshop, Repeat
Karen McMullen, Killester College

Recent reforms to the Australian and Victorian Curriculum provide a framework for developing students' awareness of metacognition and self-regulated learning strategies. This workshop will focus on developing lessons that require a range of thinking strategies with an emphasis on promoting forethought and self-reflection. Attendees will be given sample lessons and will also have an opportunity to consider how they can apply what they have learnt in their own classrooms.

G35 Problem solving in ancient China

Y7 - 12, VCAL, Lecture, Repeat
Terence Mills, Deakin University

Problem solving promotes the idea that thinking is fun. The 'Nine Chapters of the Mathematical Art' is an anonymous mathematical work that originated in China at least 2000 years ago. The book consists of 246 problems organised into nine chapters. It is a tour de force in the history of mathematics in China. An English translation was produced by Kangshen, Crossley, and Lun in 1999. The aim of this paper is to present an overview of this book. What can we, in Australia, in 2017, learn about teaching mathematics through problem solving from this ancient work?

G36 101 problems worth coding

Y7 - 12, Workshop, Commercial
Peter Fox, Texas Instruments

Coding is a lot more than a 21st century career option. Coding promotes logic and reasoning, critical thinking, perseverance and the ability to contextualise and de-contextualise a problem. The Victorian curriculum now includes specific standards related to coding; VCMNA: 254, 282, 307, 334 and 358. In this workshop participants will explore a range of mathematics problems where coding is a much a part of the solution as calculus and algebra.

G39 Using TI-Nspire CAS in the middle years mathematics classroom

Y9 - 10, Workshop, Repeat
Shane Dempsey, THAC

In this hands-on workshop a number of activities will be presented that will enhance the teaching and learning of mathematical concepts in the middle years classroom. The functionality of the CAS will be utilised in applications such as Graphing, Geometry and Notes pages. Participants with limited experience using the CAS should benefit from this session.

G42 The four proficiencies strands plus one? Productive disposition and the Australian Curriculum: Mathematics

Y1 - 12, Lecture
Aimee Woodward, University of Tasmania

It is well established that teachers should know and understand the content that they teach. Teachers must also have productive disposition towards mathematics if they are to foster this in their students. Teachers must believe that they and all of their students can learn, and improve in their ability to learn mathematics; that mathematics is intelligible, and that they can improve their teaching and understanding through effort. This presentation will share new research of what Australian mathematics teachers and preservice teachers believe, teach and assess in regards to the mathematical proficiencies of the AC:M and in regards to productive disposition.

SESSION G-H, Friday, 11am-1.20pm

G - H1 Individualised learning without the headaches. Using Maths Pathway

F - 12, Lecture, Double/Repeat/Commercial
Paul Rowland, East Loddon P-12

In 2017 we introduced a new teaching plan for Year 9 maths that was going to completely revolutionise the way students learned maths. Although this program was working well, we needed to scale and expand it, which just wasn't possible in its current form. We knew we needed to make a change, but also knew it was going to be a lot of work. That's why we decided to try out Maths Pathway and have never looked back. In this session, you will hear why this change has been so successful for us and how it is impacting our students (and staff) for the better.

G - H2 STEM in the Victorian Curriculum

F - 7, Workshop, Double/Repeat
Britt Gow, Hawkesdale P12 College
Emma Castelow, Fyans Park PS

In this session teachers will develop an understanding of the definition of STEM from a Victorian Curriculum F-10 perspective. The facilitator will showcase some examples of successful STEM units that integrate Mathematics and Science or Technology. Teachers will develop an understanding of how these units are structured and be provided with planning tools to develop their own STEM units.

G - H3 SAC's for Mathematical Methods courses (application tasks)

Y11 - 12, Lecture, Double/Repeat
Sanjeev Meston and Ryan Tebble, Lakeside College

This session will focus on using CAS technology (TI-Nspire) to work through Application and Analysis Task(s) SAC's (School assessed coursework) for the VCE Mathematical Methods course. During this session we will work through some interesting Application task(s) / Analysis and Problem solving tasks by deploying CAS technology effectively and efficiently targeting all three assessment outcomes of the study design.

G - H4 Making fractions exciting - what does excellence in teaching fractions look like?

Y3 - 8, Workshop, Double
Tina Fitzpatrick, Anthony John Davies and Abby Hansen, La Trobe University

We share our experiences, knowledge and expertise in conceptualising fractions, the knowledge teachers need to develop for deep understandings and strong procedural fluency in fraction arithmetic. We target one of the most problematic and anxiety-causing areas for students and unpack key messages around:

- Developing and promoting growth mindsets - building happy, positive dispositions, valuing understanding over speed, realising everyone can get better at fractions;
- Why so many students have misunderstandings and weaknesses in fractions;
- Promoting best practice - perfectly relating vocabulary, models and algorithms to build conceptual understanding;
- Communication - we tie pedagogy with practice and model ways to help students learn.

G - H5 The robots are coming - using robotics and coding in maths education

Y4 - 8, Workshop, Double
Mark Gleeson and Martin Demonsthenous, Lumen Christi Primary School

This hands-on workshop will involve a presentation focussing on a student led initiative, funded by a grant and fundraising, to promote engagement and purpose in Mathematics through the use of robotics and coding using LEGO Mindstorms Robotics and Sphero. Following this video-based presentation, participants will get the opportunity to explore the same mathematical principles our students identified using the software and pre-built robots. These include measurement, location, ratio, algebraic patterns, linear functions, estimation, problem solving and engaging practical use of arithmetic operations. Finally, participants will also share and explore their own ideas after experimentation. Notes: I will be bringing iPads and LEGO Mindstorms Robots for exploration. No software/hardware required.

SESSION G-H, Friday, 11am-1.20pm (cont.)

G - H6 Warm-ups and tuning-in

Y5 - 9, Workshop, Double/Repeat/Commercial
Lynne Laursen and Anjana Dwivedi, The Grange P-12 College

Akin to physical exercise with requirements of substantial and targeted warm ups, the same preparation can be adopted into mathematics lessons. Research from leading educational practitioners such as Robert Marzano and John Hattie supports the inclusion of warm-up activities and learning hooks, as a preview strategy to a lesson. Furthermore, these above strategies can also be adapted for use as 'tuning-in' tasks part way through a lesson as a gateway to enhance the partitioning of the lesson. This workshop will provide practical strategies for implementing this pedagogy into your mathematics lessons.

G - H7 Informatics: challenging, inspirational and relevant coding

Y6 - 12, Lecture, Double
Jan Honnens, Christ Church Grammar School, WA

At Christ Church Grammar School we have over the last few years gradually built a culture of enjoyment and excellence in informatics based on lunchtime sessions, informatics coding camps and a year-round involvement in computer programming competitions. Informatics, a mix of computer programming and mathematical thinking, has become a key motivator for many of our student and has helped them unleash their potential in both computer science and mathematics. In this session we will look at our informatics club model and discuss a solution (in Python) to a problem from each of the eight computer programming competitions that we use.

G - H9 Creating interactive learning experiences in Desmos

Y7 - 12, Workshop, Double
Samuel Hannah and Chris McCarty, Caulfield Grammar School

In this workshop you will have the opportunity to create classroom activities using the free web-based graphing calculator, Desmos. It allows you to create your own activities that provide real-time feedback, a variety of visualisations and interactive experiences. As well as being motivating and catering for a range of learning preferences, our experience has shown that these activities have transformed student thinking away from memorisations towards deeper

conceptual understanding. We will show you that creating your own activities is well within your capabilities regardless of whether you have used it before.

G - H10 Mathematica: M.A.T.H.S. in action

Y7 - 12, Computer Workshop, Double
Rohan Barry and Ian Berryman, Wodonga Senior Secondary College

Learn how teaching with Wolfram Mathematica as our computational tool has revolutionised our Maths classrooms. Not just an alternative to a graphing calculator, Mathematica is a powerful teaching and learning platform: visualising concepts, the ability to extend an idea to more complex situations, embedding the language of Maths, and how we teachers facilitate learning are some of the things we have seen improve. Come and see! We'll take you on a (short) tour of our experience, then give you time to try some of our activities and play for yourselves in this double session.

G - H11 Square numbers - not as 'square' as you might think!

Y9 - 12, Workshop, Double
Anthony Harradine, Potts-Baker Institute, Prince Alfred College, SA

Square numbers can be the starting point for a seriously rich mathematical experience for students in Years 9 or 10 (or even 11 or 12, actually). A tried and proven awesome learning journey that has amused and enthused many students. Come along and experience the journey for yourself, you will be amused and enthused, and have an activity to do that ticks various curriculum outcomes and content boxes. It is a ripper!

G-H12 Fraction attraction

Y5 - 11, Workshop
Greg Sheridan, The Scots School

This workshop will examine the language of fractions and show how numeric language plays an important role in knowledge development. It will also cover area and linear models as the foundation processes to algebraic manipulation for fraction operations. Transitions to algebraic approaches, from concrete models, for operations focussing on addition subtraction and division will be the primary focus with multiplication covered if time permits. Participants will work through two approaches for the teaching of division of fractions that will equip them to explain the process of algebraic division clearly and provide their students with two approaches for this operation.

SESSION H, Friday, 12.10pm-1.10pm

H1 Essential Assessment - assessment and curriculum made easy

F - 10, Lecture, Commercial/Repeat
Andrew Spitty, Essential Assessment

Essential Assessment provides a consistent whole school approach to summative and formative assessment and curriculum for schools. Essential Assessment allows a school to assess their students accurately to the curriculum and provide them with a personalised curriculum for each person, group or class, based on their assessment results for each strand or sub-strand and the requirements of each classroom teacher.

H2 Maths mindsets in the classroom

F - 10, VCAL, Lecture
Leanne McMahon and Anna Bock, AMSI

It is our role as educators to provide access to Mathematics learning for all students with a focus on students being thinkers, challenged and striving to be the best that they can be. We have all had students in our years at one time or another who struggled with mathematics. We were fortunate to spend a day with Jo Boaler in July and we will share insights from her work (and of course that of Carol Dweck) on the impact of growth mindsets on student's ability to experience success in mathematics learning.

H4 Making Maths300 work for you

F - 12, VCAL, Workshop,
Doug Williams

Maths300 is a professional development platform. Its purpose is simply to support continuing discussion about the look and feel of best practice mathematics education. Maths300 lessons are provided as fuel for those discussions. The session will introduce various structures teachers have used to take advantage of this professional learning purpose. There will also be opportunity to tell your stories about the contribution these lessons have made to the evolution of your own teaching practice or enhanced learning for your students?

H5 Step by step – building maths success for every student

F - 2, Workshop
Catherine Davidson and June Penney, Bacchus Marsh Primary School
Jenny Dockeary, Melton South Primary School

This practical workshop looks at successful strategies that you can readily incorporate into your daily maths program. We will explore rich problems and the use of mathematical models and hands-on resources. Learn how reinforcing and building

on the maths basic number concepts helps students connect with a wide range of problems. We will highlight the use of effective questioning techniques that can help to identify misconceptions in student thinking when solving problems. These strategies help build long-term understanding and are also recommended for students in higher grades who require intervention or who lack confidence in their maths computation ability.

H6 The importance of developing children's counting skills: the move from rote to rational counting

F - 4, Workshop, Repeat
Catherine Pearn, MGSE, The University of Melbourne

In this hands-on workshop participants will discuss the importance of young children developing each aspect of the five counting principles that govern and define counting as elaborated by Gelman and Gallistel (1978). Video excerpts and activities will demonstrate what these counting principles look like in practice. Counting tasks from the Mathematics Online Interview will be linked to the Counting section of the Framework of Mathematical Learning and activities from the Mathematics Developmental Continuum. The conceptual understanding needed to move children from using inefficient strategies to more efficient strategies will be highlighted.

H7 Let's get started! Using games to promote fluency and reasoning

F - 6, Workshop, Repeat
Ellen Corovic, MAV

Teachers will be elbow deep in dice and cards during this workshop. The session will focus on developing mathematical fluency and reasoning in students through the use of hands-on and engaging card and dice games. Teachers will be armed with a range of activities and we will explore how to easily differentiate for a range of student learning needs.

SESSION H, Friday, 12.10pm-1.10pm (cont.)

H8 Collaborative maths leadership - cultivating collective efficacy amongst teachers

F - 6, Workshop

Jen Briggs and Jade Seddon, Derrimut Primary School

This workshop will share the narrative of whole school collaboration and co-construction of a maths curriculum, enactment of an instructional model and improved teacher pedagogy and content knowledge in mathematics. Derrimut PS is a large primary school in Melbourne's west with a philosophy of learning through inquiry across the curriculum. A strong culture of professional learning has been developed using a variety of strategies and approaches which will be discussed in the workshop. The importance of building learning partnerships will also be explored.

H9 Using 'I can..' statements for planning, assessment and learning

F - 8, Workshop

Patricia O'Hara, Department of Education

Developing 'I can' statements for curriculum planning and assessment can be a powerful tool for ensuring learning in a continuum model, providing a clear direction for differentiated teaching, ensuring clear learning intentions, for moderation and for success criteria - for learning and for assessment. This session will discuss and workshop developing 'I can' statements (and use some already developed) to help teachers more effectively plan for, and assess, learning in mathematics aligned to the Victorian Curriculum. They can also be used as a resource to make learning visible for students to provide clear pathways of learning.

H10 Don't get caught up in alternative facts. How you can be more efficient and have greater impact when analysing student data

F - Adult, Lecture

Kathryn Sobey, Auburn High School

Michaela Epstein, Maths Pathway

Data analysis: A waste of time? Not even helpful? Don't know where to start? What is not often acknowledged is that data analysis can actually save planning and instruction time, and help you to be more efficient. This session draws heavily on principles of a data-driven cycle, where an ongoing process of assessment and analysis drives impactful classroom teaching. Using this cycle, many leading schools and educators have been able to drive high levels of student growth in learning. Learn powerful ways of getting good information from student data.

H11 Seeing maths

F - 12, VCAL, Workshop, Repeat

Vicky Kennard, Adass Israel School

Often students feel that being good at Maths means that they can work fast, do the sums in their heads or with minimal writing. I will be exploring how to make maths visual and how to encourage students to think about maths as a creative and visual activity.

H12 Compliance and inequality OR mathematics? Which are you teaching?

Y1 - 10, Workshop

Jude Ocean, RMIT University

In this session I will talk about the ways in which 'traditional' mathematics education has a much stronger focus on producing compliance than it does on producing mathematical understanding. We will discuss these familiar maths classroom practices: silence, watchfulness, rules, and commands.

We will also look at how competition, testing, and streaming condition students to accept inequality as 'normal'. In particular we'll discuss how drilling students in the times tables does that, and I'll provide an effective way to teach practices that do not involve drilling, repetition and recitation.

This session is intended to draw teachers' attention to an unrecognised problem that they might have, in inadvertently working against democratic values when they teach mathematics using silence, watchfulness, rules, commands, competition, testing, and streaming.

H13 Using the Bar Model method to solve multi-step word problems

Y1 - 8, Lecture, Repeat

Lei Bao, Leopold Primary School

Many primary students throughout schooling have difficulties with word problems, particularly multi-step word problems. There are an increasing number of questions in NAPLAN test that could be solved by applying the bar model method. This presentation will show how to use the bar model method effectively to assist students to solve word problems involving the part-whole relationship, comparison model and multiplicative thinking.

H15 Approximations, recursion and sampling using the technology of the Casio ClassPad

Y10 - 12, Workshop

Kevin McMenamin, Mentone Grammar

The use of recursion, approximation techniques and sampling procedures linked to probability provides the perfect opportunity to explore their detail using technology. This will be a hands-on experience that will utilise the spreadsheet, sequences, eActivity and statistics applications of the Casio ClassPad to model their behaviours. Annuities, reducing-balance home loans, Newton's Method, Bisection Method, hypothesis testing and random sample generation will be the featured concepts.

H16 How to successfully teach place value: the latest research

Y2 - 6, Workshop

Angela Rogers, RMIT University

This session will report on the findings of my research into the teaching and learning of place value in Years 2-6. It will introduce the six critical aspects of place value instruction, identify and discuss common student misconceptions and provide practical examples of how these can be addressed by teachers. The session will also share how two schools have implemented a teaching sequence based around the six aspects to improve their students' understanding of this critical area of the mathematics curriculum.

H17 Challenging Tasks: Multiplicative thinking and productive struggle

Y2 - 7, Workshop

Sharyn Livy and Ann Downton, Monash University

Challenging tasks can be adapted to a variety of levels and provide opportunities for all learners to engage in mathematical learning. Multiplicative thinking can be described as the relationship between multiplication and division and is a critical stage of children's mathematical development during their primary years of schooling. Our workshop will present some tasks on the topic of multiplicative thinking. We will share our experiences of how primary aged students apply themselves when solving these tasks and discuss the role of the teacher when encouraging productive struggle.

H18 Engaging students in applied maths that deals with real life using real data

Y3 - 10, Workshop, Repeat

Richard Korbosky, WA

Often problems in mathematics are contrived and have very little meaning to the students. If students enjoy/love football then they will thoroughly enjoy mathematics linked to rounds of the AFL and AFLW seasons. Come along and find out about AFL Footy Maths that involves students in real life problem solving, calculating, interpreting data and making predictions. This footy maths is a classroom strategy that makes maths come alive and gives teachers a strategy to plan for future classroom activities.

H19 How an inquiry approach to mathematics promotes learner agency

Y3 - 7, Lecture,

Fiona Clarke and Meghann Wurm, Mackellar Primary School

During this session we will share with you how a mathematical inquiry approach supports students to have power to act on their learning (learner agency). We will highlight how

- Students managed their learning, developed their own inquiries and become creative, critical and reflective thinkers.
- How students were supported to explore ideas, solutions and reason through a collaborative process.

SESSION H, Friday, 12.10pm-1.10pm (cont.)

H20 Developing algorithmic thinking in the primary and junior secondary years

Y3 - 8, Workshop, Repeat

Max Stephens, MGSE, The University of Melbourne

Algorithmic thinking is now part of the Victorian Curriculum. The goal is to teach students how to think logically as they solve problems. Algorithms are the opposite of lucky guesses and/or trial-and-error strategies. They break down a problem into a number of smaller steps in order to develop (test/revise) a structured approach to solving a problem. Students can represent algorithms in everyday language, or as flow charts, or in a simple coding language. Algorithms should arise naturally in mathematics in the primary and junior secondary school years. This presentation will also identify valuable teacher resources for developing algorithmic thinking.

H21 A numeracy intervention program achieving outstanding growth

Y4 - 10, VCAL, Repeat/Commercial

Michelle Anderson and Helen Barker, Numurkah Secondary College

Numurkah SC is in its third year of the Quicksmart Numeracy program achieving growth rates of in excess of 2.5 times their peers. The Quicksmart program works on fluency of basic operation to free up working memory for high order operations by improving the students' information retrieval times. We are seeing a defiant closing of the gap between our top students and those in the 'forgotten' middle third of our cohort.

H22 The dog ate my homework

Y5 - 10, Workshop, Repeat

Joe Wright, Joanna Tutos and Paul Wright, The Educational Advantage

There are all sorts of excuses given by students for failing to complete their homework, but the true culprit is disinterest. How often have you heard a student say, 'When will I ever use this?' We understand that the disengagement between students and homework needs to be addressed and as educators we know that one size does not fit all. Join us as we present solutions that provide both remediation and differentiation in a meaningful way. This session will be interactive and will explore new and fun approaches to learning. Please bring along your laptop or tablet.

H23 Strategies for differentiation in the mathematics classroom

Y5 - 12, Workshop, Repeat/Commercial

Thomas Moore, Maths Pathway

The biggest challenge for teachers is developing lessons which cater for a wide range of abilities within their classes. In this presentation we will explore how to differentiate your classes in order to overcome these challenges. We will cover everything from rich tasks and developing good classroom routines to using technology to enhance learning for students of all abilities. I will also cover the Maths Pathway learning model and how this can be used to assist with differentiation.

H24 Complexity factors in mathematics assessment items

Y5 - 8, Workshop

Jim Spithill and Jen Halliday, ACER

In this session we consider the usefulness of a proven Complexity Framework, developed for use in the OECD's PIACC Survey of Adult Skills, when writing assessment items for students in Years 5 to 8. We will discuss what is meant by the complexity of a question, and how its meaning shifts when moving between 'mathematics' tasks and 'numeracy' tasks. The PIACC rubric works around five complexity factors including problem transparency, mathematical content and the operations and number of steps required. Participants will be given the opportunity to apply the rubric during the session and to discuss its potential usefulness when developing assessment items that are of a desired range of difficulty and challenge for students.

H25 Algebraic thinking through the use of cups and cubes

Y5 - 8, Workshop, Repeat

Nick Serafidis and Val Steane, Kew High School

A hands on approach to teaching the basics of algebra. Many students find algebra difficult later in their schooling as the basic concepts are not firmly established. We will show you how to use concrete manipulatives in a fun and engaging way to get students off to a flying start in algebra.

H26 Targeting student need in mathematics, our experience using Maths Pathway

Y5 - 9, Lecture,
Deborah Murrell, Lavalla Catholic College

In 2014 Lavalla Catholic College introduced the targeted, differentiated learning model, Maths Pathway to year 7 students. Our journey to implement the program has had highs and lows and importantly forced a change to the way teachers teach Mathematics. Now the first group of Year 7's are in year 10 and we teach using the Maths Pathway model throughout the school. This presentation is a candid look at the success of the program and what we have learned.

H27 Are you struggling to engage middle school students in the maths classroom?

Y7 - 10, Lecture, Repeat
Adam Kruger, Wesley College
Scott Rumble, Parkdale Secondary College

Students learn best when they are motivated to learn by seeing the value and importance of the information presented. This presentation will exhibit our ASAP, a student approach to learning. It is a 7-10 secondary mathematics program, which we developed at our college and are now working with a number schools to implement this exciting approach to learning mathematics. Throughout the session we will demonstrate how we motivate students to learning, create an interactive atmosphere to allow for student voice, build connections through directed assessments, provide opportunities to apply knowledge to real world situations, challenge and engage students through effective feedback strategies and work through using data as a tool to improve key numeracy skills of our students. By the end of the session, each attendee will walk away with engaging activities and strategies that they can use immediately in their classroom.

H28 Searching, sorting, algorithmic thinking and maths

Y7 - 10, Workshop
Nat Bradshaw, Lowther Hall Anglican Grammar

This workshop will explore different algorithmic strategies to search through and sort data quantitative. The relationships between these algorithms and mathematics will also be discussed. Participants will then look at the code to implement various searching and sorting strategies using Python.

H29 Small changes towards a bigger impact

Y7 - 10, Lecture, Repeat
Vanessa Rule-Paddle and Antje Leigh-Lancaster

As technology develops, the way we access information and data has changed. While there is talk about robots replacing current jobs, and the need to prepare students for jobs that don't exist yet, there is still a need to cover the curriculum. How do we navigate this landscape as teachers? This session aims to share some small changes to make to your everyday teaching to help students develop problem solving skills, mathematical thinking and to create connections to their world. In this practical session participants will have the opportunity to share ideas and engage with some of the proposed activities.

H30 Advanced, standard and remedial maths – how to create a successful secondary program that really works!

Y7 - 11, Lecture
David Greenwood and Simone Zmood, Trinity Grammar School

This session will present an integrated and dynamic secondary school mathematics program which pro-actively caters for the full diversity of student ability and motivation. Discussion will focus on:

- A pathways model which considers flexible grouped and mixed ability classes and how this leads to VCE choices
- Assessment types including both test and non-test based assessment and analysis of this for reporting
- Assessment tools including rubrics for varying assessment types
- Use of enrichment programs and competitions to open opportunities and enrich the mathematical experience.

H31 Increasing discussion and interaction in mathematics classes

Y7 - 12, Lecture
Nicola Petty, Statistics Learning Centre, Christchurch NZ

This workshop includes an examination of why discussion helps learning, and techniques for encouraging discussion. Traditional mathematics teaching did not involve a great deal of discussion, and consequently some teachers find this challenging. In this fun, hands-on workshop we will explore strategies to improve classroom discussion to help learning statistics and mathematics, and look at common pitfalls and how to deal with them. We will also share sources of great ideas from the Maths Twitter Blogosphere.

SESSION H, Friday, 12.10pm-1.10pm (cont.)

H32 What were you thinking?

Y7 - 12, Lecture, Repeat

Dietmar Schaffner, Penleigh and Essendon Grammar School and Zoe Schaffner, The University of Melbourne

Have you ever assessed a student's work and wondered, what were you thinking? This option explores emerging research into inner speech, and what this might reveal about students' mathematical thinking, and reports on the preliminary results of a school-based research project into students' mathematical thinking loosely based on the Descriptive Experience Sampling method pioneered by Russell T. Hurlburt.

H33 Mindfulness in the secondary school classroom

Y7 - 12, Workshop, Repeat

Elizabeth Shepherd, Canterbury Girls' Secondary College

Mindfulness is more than a passing fad. When students are truly present they are better able to learn and achieve their potential. Students who are anxious, depressed or struggle to engage in the classroom may benefit from learning to practice mindfulness. This presentation describes MEd research into the use of mindfulness in an independent secondary school. The case study investigates experiences of the school leadership, staff and students- teaching, learning and using mindfulness. Additionally the presenter, a current maths/science teacher, will discuss introducing mindfulness into the curriculum at her secondary school in Melbourne. Mindfulness activities will be included.

H34 CASIO education resources – a guided tour

Y7 - 12, Lecture, Repeat

Alastair Lupton, Le Fevre High School South Australia

The Casio Education website has had something of a make-over recently. It has a surprising amount of high quality resources, some on technology, some on teaching mathematics, and some on teaching mathematics with technology. It is a treasure trove! Come along for a guided tour.

H35 Origami, maths and reverse engineering

Y7 - 12, VCAL, Workshop, Repeat

Jan Mann and Ming Gao, Wellington Secondary College

Origami activities are great hands-on tasks which will assist students to visualise 3D shapes. Students will enhance their ability to learn new things through the process of reverse engineering - which is taking apart an object to see how it works in order to duplicate or enhance the object. This workshop will provide an opportunity for participants to engage in discussions about the connections between origami, maths and engineering. The idea of reverse engineering may be used when introducing students to the problem solving strategy of 'working backwards'. Participants will work collaboratively to construct and analyse origami 3D objects.

H37 An interactive statistical sampling activity with chocolate

Y8 - 12, Lecture

Anthony Morphett and Sharon Gunn, The University of Melbourne

We will present an activity that engages students with key statistical ideas – including sampling, bias, variability and estimation – using virtual blocks and real chocolate. The activity provides an experiential foundation for building understandings of important statistical concepts, produces data which are meaningful to students, and it is a learning task that allows for multiple entry and exit points. Furthermore, it can be tailored for Years 8-12 and class sizes from 20 upwards. The activity is easy to implement, supported by good documentation and freely available on the web.

H38 Using TI-Nspire CAS in the middle years mathematics classroom

Y 9 - 10, Workshop, Repeat
Shane Dempsey, THAC

In this hands-on workshop a number of activities will be presented that will enhance the teaching and learning of mathematical concepts in the middle years classroom. The functionality of the CAS will be utilised in applications such as graphing, geometry and notes pages. Participants with limited experience using the CAS should benefit from this session.

H39 Mathematica, an introduction and more

Y7 - 12, Computer Lab, Repeat
Ian Willson

This workshop will provide to those with little or no previous experience of Mathematica (now freely available to Victorian secondary students in both state and private schools) an introduction to what it can do and how secondary students can use it as both a computational, learning and discovery tool (arguably cheaper and better than a CAS calculator). Activities and notes will be provided for the workshop and for school classroom use. Areas covered: basic algebra, graphics, statistics, functions and graphs (including circular functions), probability and calculus. The manipulate function will be demonstrated (a beautiful Mathematica equivalent to CAS slider functionality).

H40 Delivering excellence in financial literacy

Y7 - 10, Workshop, Commercial
Damian Nicholson, Financial Basics Foundation

FBF provides free of charge to all Australian secondary teachers, extensive resources and services designed to support students to develop capacity to make responsible and informed financial choices. The Victorian Mathematics Curriculum offers a significant opportunity to use financial literacy as a context for a range of mathematical operations and applications in your classroom. This workshop will focus on exploring ESSI Money vs2, an interactive online game which delivers an innovative app based environment. Students practise a wide range of real life earning, saving, spending and investing transactions, and experience the financial consequences in a safe, fun and challenging way.

SESSION I, Friday, 2.30pm-3.30pm

I1 Maths in the mulch: real-life learning through a kitchen garden program

F - 10, Lecture, Repeat

Rebecca Naylor and Stephanie Davies, Stephanie Alexander Kitchen Garden Foundation

This session explores what excellence in mathematics teaching looks like through a hands-on approach informed by real-world kitchen and garden contexts. Kitchen garden schools in Years F-10 across the country are already using real-world spaces for students to learn all kinds of maths through growing, harvesting, preparing and sharing their own fresh, delicious food, and they're loving every minute of it. Learn how to engage a mathematical mindset and grow a healthy approach to learning maths through real-life examples and a unique approach that underpins the curriculum and offers students diverse learning opportunities and experiences.

I2 Mindset: where is your head at?

F - 10, Workshop, Repeat

Christopher Daxecker, John Eskander and Stephanie Black, Tarneit P-9 College

Creating a positive mindset in mathematics is difficult. As teachers we often hear 'I can't and it's too hard'. This professional learning will give you the tools that you need to engage students and change mindsets to 'I can and this is challenging'. We will present a variety of simple practices that can turn classrooms of fixed mindsets into positive and vibrant Mathematics classrooms. It will open your eyes to the simplicity of engaging and rich tasks that include creativity and critical thinking. Students will feel empowered and understand that being challenged is not a bad thing and mistakes should be celebrated. We will show you how to model across year levels and content strands to engage students within their learning and so that you can hear the words 'I love math'

I4 MAV student activities – enhancing problem solving and Inquiry

F - 12, VCAL, Lecture, Repeat

Jennifer Bowden and Helen Haralambous, MAV

The MAV has an outstanding Student Activities portfolio with a range of events, competitions and activities for students from Foundation to Yr 12. In this presentation, we will share the various activities MAV offer and support. How do you start an investigation? How do you enter the MTQ? What is a MAV Games Day and how do I enter? Can

I run one of my own at school? I'd love to engage my school community in a Family Maths Night but don't know where to start? This workshop will be hands on, explore investigations and leave you wanting to inspire your students further.

I5 Increasing challenge and problem solving for Year 1 students

F - 2, Lecture

Michael Bairstow, Holly Phillips and Alyssa Galea, St Dominic's

At St Dominic's we have been focusing on making small shifts in our pedagogy. We have been trying to incorporate more problem solving, increasing challenge and making students more active during Maths sessions. Implementing this kind of pedagogy presents challenges at all levels but especially in the junior area. During this session two grade 1 teachers will be sharing their experience, how their pedagogy has developed and some of their favourite and most successful tasks.

I7 Handling hands on

F - 8, Workshop, Repeat

Jacinta Blencowe, AMSI

Hands on and practical activities are a great way of engaging students in mathematics. In this workshop you have the opportunity to get 'hands on' with a variety of common resources and open ended tasks to engage students and make maths fun.

I8 Differentiation and rich tasks: SAEPS our journey

Y1 - 4, Workshop

Haylie Saarinen and Tristan French, St Albans East Primary School

St Albans East Primary School teachers share their journey in developing a differentiated classroom with the use of rich tasks. Demonstrating how rich tasks have positively impacted their planning, assessment and student learning in their classrooms. Exploring their favourite rich tasks and lesson ideas for fun and engaging mathematics lessons from Years 1 to 4.

I9 Making mathematics teaching exciting

Y1 - 8, Workshop, Repeat

Charlotte Wilkinson, NZ

Sherryl Gomm, Awapuni School, Gisborne, New Zealand

A journey, moving from 'doing' problem-solving to teaching and learning 'through' problem-solving. A significant pedagogical shift. Taking the plunge. Overcoming barriers. Accessing support. Surviving the doubt. Reaching the rewards. Co-presented by a primary mathematics consultant and a mathematics team leader/classroom teacher using real students work to map the journey.

I10 Maths and music

Y10 - 11, Workshop

Neale Wood

In this 'hands on' session, the strong connection between mathematics and music will be explored. Topics covered include the chromatic scale, synchronous and asynchronous waves, addition of ordinates, and modelling. In addition to the theory, microphones will be available for participants to collect and analyse sound from various sources. TI-Nspire CAS technology and Vernier software will be used for real time data collection but the material covered will be suitable for teachers using other CAS technologies.

I11 VCAL numeracy meets Edison Robots

Y10 - 12, VCAL, Workshop, Repeat

Kath O'Shea, Bendigo Senior Secondary College

Why should junior and VCE Mathematics classes get to have all the fun with STEM activities? This session will show you how simple, cost-effective and engaging it is to use Edison Robots in VCAL Numeracy classes. Teach numeracy by stealth as students meet outcomes by solving hands-on challenges related to estimation, speed, time, distance, direction, design and much more.

I12 Specialist SAC application tasks modelling examples from astronomy

Y10 -12, Workshop, Repeat

Wayne Semmens, Gippsland Grammar

Astronomy provides many interesting modelling examples which can be used from Year 10 Maths to Specialist SACs, to improve student engagement in Mathematics. Examples will include a Year 12 Specialist SAC 'Using vector functions in parametric form to model the possible collision of an asteroid with the Earth', and a Year 10/11 assessment, determining the

age of the universe.

I13 Learning experience with calculus

Y10 -12, Workshop, Repeat

Chan Yew Fook, The Learning Academy

The workshop will focus on how to create a learning experience for students and teachers in the teaching and learning of differentiation of functions from first principles. Participants are encouraged to bring along a TI-Nspire CX graphing display calculator for the session.

I14 Teaching VCE Mathematical Methods for the first time - some tips and tricks

Y11 - 12, Workshop, Repeat

Mary Papp

Presentation of best practices I have been fortunate to witness or be involved in to deal with issues such as setting up the year, handling SACs, how to overcome areas/concepts that students find difficult to grasp, use of CAS, exam technique, time saving free resources and any other questions. Bring a USB and be prepared for active participation.

I15 Sphinx again

Y2 - 10, Workshop

Doug Williams

Think you know the Sphinx problem? Sphinx again! Bet you haven't started by folding paper to make your own sphinxes. No scissors in sight. You probably also haven't explored them guided by a picture puzzle. Here's the opportunity to do these things and more. If you have never heard of the Sphinx problem then come along to Sphinx about it for the first time. In either case, expect to be hooked like many teachers and kids before you. Please bring a smart device.

I16 Developing mathematical fluency at all levels through rich tasks

Y2 - 12, Lecture

Nicola Petty and Shane Dye, Statistics Learning Centre

Number fluency is essential for continuing development in mathematics. At higher levels, students also need fluency in recalling and applying concepts and rules around algebra, calculus and other areas of mathematics. Fluency is often associated with speed of recall, whereas it involves conceptual understanding and ability to transfer. In this workshop we will examine a range of tasks, and explore how they help students develop fluency in a holistic way. Participants are encouraged to bring their own activities for discussion.

SESSION I, Friday, 2.30pm-3.30pm (cont.)

I17 Automatic recall of basic number facts

Y3 - 10, Lecture, Repeat

Johanna Crisp and Kerri Goode, Sale College

In 2016 we were concerned Year 10 students were not progressing, and were unable to retain previous learning. As a cohort we noticed they were struggling with basic computation. Research states automatic recall is 60 basic operation questions in 2 minutes at a Year 5 Level (we consider this to be a bare minimum for Secondary students). We tested their basic number facts;

Year 10 2016

- addition/subtraction 24% > 60 questions
- multiplication/division 6% > 60 questions

Whole School (Year 7 – 11) 2017

- addition/subtraction 23% > 60 questions
- for multiplication/division 7% > 60 questions.

We will address the ‘importance of automaticity’, and the implications of freeing up cognitive space for higher order thinking’. We will show our improvement data, and share the programs we have implemented.

I18 Assessing mathematical reasoning

Y3 - 6, Workshop, Repeat

Sandra Herbert and Colleen Vale, Deakin University

‘reSolve: Mathematics by Inquiry’ is a national Australian Government funded project that provides Australian schools in Foundation to Year 10 with resources to help students learn mathematics in an innovative and engaging way. The Mathematical Reasoning Research Group (MaRRG) from Deakin University have developed resources for assessing mathematical reasoning for Years 3 to 6. The resources will assist teachers to conduct formative and summative assessment of children’s mathematical reasoning. The lecture will present the rubric with identified levels of reasoning appropriate for a range of mathematical domains in Years 3 to 6.

I19 Multiplication with meaning

Y3 - 6, Workshop, Commercial/Repeat

Justine Shelley, St Mary’s

Maths can be a subject associated with negative feelings and anxiety, more than any other. As Primary Teachers, we want to ‘catch’ our students in Years 3-6 and equip them

with skills and confidence, as they head towards Secondary School. We believe that everyone can be a ‘Maths person’, given the right opportunities! Knowing and understanding the multiplication facts and the principles of multiplication, are vital. We’ve created our own online resource; ‘Mfacts121’. It helps students work through learning the skills and strategies needed for multiplication, in a comprehensive and engaging way. See mfacts121.com for details of our resource.

I20 The mathematics of magic

Y4 - 10, Lecture, Repeat

Greg Carroll, AMSI

Magic is a fun way to engage students with mathematics. A handful of easy tricks will be presented, along with how to perform them, and then we will explore where they can be used to introduce particular topics. A couple of tricks which specifically lead to a discussion on growth mindset will be considered.

I21 Number genetics

Y4 - 10, Lecture, Repeat

Mike Clapper, AMT

Every whole number has a unique ‘genetic’ code based on its prime factors. Whilst prime factorisation is a part of the curriculum, many of the properties which arise from it are not explored, to the detriment of students developing a ‘feel for numbers’. This talk will present a number of these properties and some problems which can be solved by a deeper understanding of prime factors of numbers, along with many ideas for student investigations.

earlier Mathomat transformations as well as giving insight into subsequent line and rotational symmetry operations.

I23 Engaging hooks

Y5 - 12, Workshop, Repeat
Thomas Moore, Maths Pathway

We will be exploring a range of engaging hooks that can be done in 5-10 minutes at the beginning of each class. These hooks are designed to get students talking and engaging with the mathematics, and are open to all students to experience success.

I24 My students don't know their tables!

Y5 - 12, VCAL, Workshop
Michael O'Reilly and Norrian Rundle

Too many students in the middle years do not have automatic recall or even efficient strategies to work out the multiplication facts. While they may have been taught strategies to work out their multiplication facts, they mostly resort to counting on their fingers, using the 'tables' on the back of their exercise book or calculators. This session will look at an alternate representation of the 'times tables', with associated efficient strategies for learning the multiplication facts. In this option you will be shown how to effectively teach the multiplication facts to middle years students who do not have automatic recall.

I26 Teaching line graphs through emotions

Y5 - 8, Workshop
Jude Ocean, RMIT University

Line graphs are a difficult subject for many upper primary teachers and this session will show you how to introduce them to children in Years 5-7. We'll do this first by graphing emotions (think Wall Street Stock Exchange graphs and you'll get an idea!). Bring a story to tell about what you got up to last weekend, and a favourite children's book that involves feelings like excitement, sadness, happiness, trepidation. We'll show you how to use Shaun Tan's *The Lost Thing* and *The Rabbits* to construct line graphs, and then help you to make your own using the book you bring. Then we'll link these to more conventional line graphs. If line graphs have always concerned you, this is the session for you.

I27 Integrating algorithms and coding into the mathematics classroom

Y7, Lecture, Repeat
Chris Paragreen and Bernie McGrath

This presentation looks at the approach Kew High School has taken to incorporate algorithms and coding into several of our Year 7 units this year. Our approach aims to embed realistic and relevant applications of algorithms and coding without the need to add new units to the crowded mathematics curriculum. It also ties in with STEM education principles.

You will gain access to the resources we have developed so that you may adapt them to your own classrooms. Time will also be made available to discuss strategies adopted at other schools, together with the pros and cons of different approaches.

I28 Deep learning - powerful mathematics

Y7 - 10, Workshop
Jim Lowe, YuMi Deadly Centre QUT

Many traditional classroom activities focus on the application of a rule or procedure to find an answer. Often the technique required is clearly evident in the question or exercise necessitating little thinking from the student. This session will explore some techniques to turn routine activities into opportunities for deeper thinking and also embed some powerful mathematical ideas. Activities can be adapted to suite different school level including some that have been converted to take advantage of available technology to produce an unlimited supply of problems at the click of a mouse.

SESSION I, Friday, 2.30pm-3.30pm (cont.)

I29 Mathematica for the Victorian Curriculum 7 - 10

Y7 - 10, Computer Workshop,
David Leigh-Lancaster, VCAA

In this session we explore Mathematica functionality across the three strands of the Victorian Curriculum Mathematics F-10 using prepared notebook files. For this session, participants will need to bring their own laptop with Mathematica loaded and activated. A 15 day free trial can be accessed from <https://www.wolfram.com/mathematica/trial/>. Victorian secondary teachers can access Mathematica for free from DET.

I30 Origami, maths and reverse engineering

Y7 - 12, VCAL, Workshop, Repeat
Jan Mann and Ming Gao, Wellington Secondary College

Origami activities are great hands-on tasks which will assist students to visualise 3D shapes. Students will enhance their ability to learn new things through the process of reverse engineering - which is taking apart an object to see how it works in order to duplicate or enhance the object. This workshop will provide an opportunity for participants to engage in discussions about the connections between origami, maths and engineering. The idea of reverse engineering may be used when introducing students to the problem solving strategy of 'working backwards'. Participants will work collaboratively to construct and analyse origami 3D objects.

I31 STEM: Women are (still) all over it

Y7 - 12, Lecture, Repeat
Katherine Seaton, La Trobe University

50 women who have made significant contributions to mathematics and other sciences across continents and centuries were featured in 2015 on a shirt (STEM: Women are all over it). Come and meet some of these women, together with the inspirational women of Hidden Figures.

I32 Desmos: graphing and animations

Y7 - 12, Lecture, Repeat
Roger Walter, Editor of Vinculum

Desmos is a free online graphing tool with capacity for animation. I will be looking at some of the possibilities for classroom use. It will include, but not be restricted to, my Vinculum article in Term 2 about projectile motion and Limacon curves. Desmos can be used on computers, tablets and smartphone.

I33 Flipping out! How I flipped my maths classroom and you can too!

Y7 - 12, Workshop
Aimee Shackleton, Balcombe Grammar School

Curious about flipped learning? Ever wondered what the best use of your class time is? This presentation will cover tips and ideas, challenges and successes of flipped learning, from Foundation to senior years classes. Multiplatform options for video creation, online hosting and student feedback will be discussed to best suit your needs, including a number of free options. Delegates will be shown how to make a short video using some free software, and a writing tablet. Time permitting, delegates will have the option to create a short video on their laptop.

I34 Education Perfect: empowering and promoting self-regulated learning

Y7 - 12, Lecture, Commercial
Clare Feeney, Education Perfect

Formative assessment is specifically intended to generate feedback on performance to improve and accelerate learning, to help instructors understand their students' day-to-day learning and to develop appropriate interventions to improve that learning. Education Perfect presents a platform that allows students to gain an understanding of topics through rich images and video, and provides feedback for teachers to inform their teaching, assessment and reporting cycle of the differentiated classroom. This session is a demonstration that shows how Education Perfect allows teachers to customise content, locate and assign Australian Curriculum-aligned content, set and assess tasks, build assessments and track student progress.

I35 Wolfram Mathematica for statistics and data analysis in Year 7-10 curriculum

Y7 - 12, VCAL, Lecture, Commercial
Craig Bauling, Wolfram Research

Learn how Wolfram Mathematica and Wolfram|Alpha Pro can support the teaching of statistics and data analysis in your classroom. This will be an example-based presentation where specific curriculum dot points will be explored. Examples include stem-and-leaf, dot plots, box plots, mean, median, mode, range, creating datasets and sampling, with interactive exploration. The Victoria Department of Education is supplying to all public and private schools the complete Wolfram tools suite including: Mathematica for higher secondary explorations, Mathematica Online for iPads and

Tablets, Wolfram|Alpha Pro for cross discipline exploration, Wolfram Programming Lab for Digital Technology, and Wolfram SystemModeler for Science modelling.

I37 SURVIVORing Year 7 mathematics

Y7 - 8, Workshop, Repeat
Ann Kilpatrick

In this presentation, participants will be exposed to a refreshed pedagogical model for the structure and delivery of the Year 7 mathematics curriculum, striving to develop a 'positive psychology' environment rather than a 'maths anxiety' environment, in the hope of seeing students embracing the study of mathematics as a subject to be enjoyed rather than feared. The model embeds key elements of 21st century learning: communication, collaboration, creative thinking, critical thinking and self-management to enable the development and engagement of students in being 'hands-on, front and centre' in their learning journey with mathematics.

I38 Maths or knot maths?

Y8 - 10, Workshop,
Norman Do, Rebecca Cooper and Joanne Burke, Monash University

This workshop session aims to inspire teachers to consider a different perspective of maths and to showcase the nature and beauty of maths with their students. We will watch segments of purpose-made videos and engage with activities to generate discussion around ideas of how to strengthen links between contemporary mathematics and the mathematics curriculum. We are looking to begin the process of shifting teacher's mindsets to have them consider a broad approach that goes beyond the tip of the maths iceberg that is so often

the focus of maths in schools.

I39 Encryption using Python (applied probability)

Y9 - 12, Workshop, Repeat
Sanjin Dedic, Techxellent
Nat Bradshaw, Lowther Hall Anglican Grammar

Every waking second millions of people are talking on the phone, reading emails and text messages. All of this is made possible by encryption which is a method for scrambling (encrypting) data in such a way that it can be only be unscrambled by a person who owns a digital key which can unscramble (decrypt) the data. In this presentation you will have a hands on insight into the coding aspects of encryption as well as the mathematics which can precisely calculate how safe it is. In other words how many guesses (in the millions/billions/trillions) a hacker would have to perform to discover your key.

I40 Exploring the parabola

Y9 - 12, Workshop,
Shane Scott, Marist College Eastwood NSW

Using dynamic software to investigate the forms and geometry of the parabola we will be looking at the graphs using the roots of a quadratic and investigating how to construct a parabola using the conditions of the locus.

I41 The mathematics of wing design – an excellent example of where maths is used in modern civilisation

Y9 - 12, Workshop,
Michael O'Connor, AMSI

December 17 marks the 114th anniversary of the first human powered flight. Since then humanity has gone on to make air travel a daily event for millions of people. In order to this a reality it was necessary to understand how to produce forces that would overcome gravity and air resistance. The mathematics involved in designing and building a plane can all be acquired by the end of Year 12 from Methods and Specialist content. As a way of demonstrating how and where high school mathematics is needed in the modern world, powered flight is an example par excellence.

SESSION I, Friday, 2.30pm-3.30pm (cont.)

I42 The essential elements of lessons that include all students in building understanding, solving problems and reasoning mathematically

Y7 - 12, VCAL, Lecture
Peter Sullivan, Monash University

There is widespread agreement that student driven inquiry approaches can assist students in building understanding, solving problems and reasoning mathematically. But to ensure that all students are included in the learning opportunities, specific teacher actions are needed and lessons can best be structured in particular ways. This session uses examples of challenging mathematics learning experiences to illustrate the key elements of such teacher actions and mathematics lessons.

I43 Quarter the Cross: fractions, geometry and reasoning for all levels

F - 12, VCAL, Workshop
David Butler, University of Adelaide

Quarter the Cross is a task that seems simple: colour one quarter of a cross made of five squares. Yet it has the remarkable ability to engage people of all levels in discussion, problem-solving, creativity and reasoning. I have seen teachers, mathematicians, and students from early primary to university level use Quarter the Cross to investigate their understanding of fractions, measurement and geometry. In this workshop you will have a chance to experience several ways to use the problem in a classroom, and investigate your own understanding of mathematical concepts.

SESSION I-J, Friday, 2.30pm-4.40pm

I - J1 The crucial and underpinning role that language plays in the teaching and learning of maths and numeracy

Y1 - 11, VCAL, Workshop, Double
Dave Tout, ACER

Why do teachers of numeracy and mathematics also need to be language (and literacy) teachers? This presentation and hands-on workshop will look at issues related to the relationship between numeracy and mathematics, and the crucial role that language (and literacy) plays in the teaching and learning of both mathematics and numeracy. Based on this analysis, what are some of the key challenges in how to teach numeracy successfully taking the language aspect on board, and what are some teaching strategies and approaches that support and integrate the language of mathematics into our classroom practices.

I - J2 Embedding ongoing student-focused, assessment, feedback and guidance strategies

Y5 - 12, VCAL, Workshop, Double
Craig Becker, Collaborative Strengths

Learn about and practise strategies that are specifically designed to reduce assessment based anxiety whilst increasing opportunities for improved student performance. This workshop will help teachers put the student in the centre of the frame, on a daily basis, with respect to being responsible for, understanding and acting upon feedback and guidance. Teachers will experience how to create a carefully structured engaging, safe and supportive learning environment. Teachers will be provided with a detailed graduated implementation plan as well as being exposed to practices that will streamline the time they spend marking whilst maximising their impact.

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SESSION J, Friday, 3.30pm-4.30pm

J1 Training teachers in East Africa

F - 12, Lecture, Repeat
Jenny Clark

This is for teachers with a sense of adventure and a yearning for social justice. Volunteering in a developing country can be rewarding professionally and personally and is a way of seeing the world in a different way. I will be talking about my experiences working with teachers in Uganda and Tanzania in government and private schools with three different organisations over the last seven years. Maths teachers in Africa are starved of professional development opportunities and are looking for new ways to teach traditional subjects - you could help them and have a lot of fun along the way.

J3 Co-teaching in mathematics: powerful learning for students and teachers

F - 2, Lecture
Rebecca Stewart, Bialik College

This session will describe an action research project involving a team of teachers and a numeracy coach as they follow a cycle of planning, co-teaching and debriefing a series of lessons to Year 1 students. The session will report the benefits of this model for student learning and as a form of professional learning for teachers. It will also describe spin-off benefits such as the development of mathematics learning walls.

J4 From closed to open - differentiated investigations allowing students to become proficient mathematical learners

F - 6, Workshop, Repeat
Brendan Hodge, Lang Lang Primary School
Karyn Thomas, Wonthaggi Primary School/Lang Lang Primary School
Kristy Miller, Woodlands Primary School

Opening up closed activities to not only explicitly teach skills but to cater for problem solving, thinking, reasoning, and communication. Rich open investigations that all students can access with multiple entry and exit points. Exploring the role of the teacher and students during an open investigation.

J5 Exploring problem solving: Fermi problems

F - 6, Workshop
Haylie Saarinen and Lana Dimitrijevic, St Albans East Primary School

Engaging primary students with open-ended problem solving tasks. We explore Fermi problems in the classroom, developing student problem solving skills and strategies, risk taking and confidence in estimation and approximation.

J6 Getting creative with maths and growth mindsets

F - 6, Workshop, Repeat
Rebecca Harris, Dandenong Primary School

Children are born into the world with an innate sense of number, curiosity to explore patterns and problem solve, and the instinct to persist with challenges. Yet we as educators see this dwindle away as students learn to accept they are not good at mathematics. What implications does this have for our teaching practice? Explore research behind growth mindsets, and develop ideas and strategies to connect students to mathematics through art and creativity. Reignite the fire with colleagues, who themselves, see mathematics as a challenge. Foster skills to build dialogue and reasoning strategies amongst students through visual artistic ideas.

J7 Mathematics is a fun activity with folding paper

F - 9, Workshop, Repeat
Karim Noura, Bayside P-12 College

In this workshop, teachers will have the opportunity to explore and visualise problem solving situations with folding paper. It will be also an opportunity to share ideas and experiences of teaching mathematics with hands-on activities.

J8 Learning experience with calculus

Y10 -12, Workshop, Repeat

Chan Yew Fook, The Learning Academy

The workshop will focus on how to create a learning experience for students and teachers in the teaching and learning of differentiation of functions from first principles. Participants are encouraged to bring along a TI-Nspire CX graphing display calculator for the session.

J9 Specialist SAC application tasks modelling examples from astronomy

Y10 -12, Workshop, Repeat

Wayne Semmens, Gippsland Grammar

Astronomy provides many interesting modelling examples which can be used from Year 10 Maths to Specialist SACs, to improve student engagement in Mathematics. Examples will include a year 12 Specialist SAC 'Using vector functions in parametric form to model the possible collision of an asteroid with the Earth', and a year 10/11 assessment, determining the age of the universe.

J10 Introduction to programming using TI-Nspire

Y11 - 12, Workshop, Commercial

Raymond Rozen, RMIT University

In this hands on workshop, participants will be introduced to programming using TI-Nspire. This can be done using TI-Nspire handhelds, computer software or on the app for iPad. Programming, has become a critical skill for 21st century careers, so come along and learn how to create, save, and run programs, including input and output, using loops and conditional statements. No previous programming experience of any kind is required. TI-Nspire handhelds will be provided if you do not have your own.

J11 Teaching algorithmic thinking - VCE algorithmics (HESS)

Y12, Workshop, Repeat

Georgia Gouros, Distance Education Centre

An exploration of ways to expand students' high order thinking skills so that they can look at a real world problem and be able to formalise a model and a process in order to find a solution. This session will discuss some of the activities used at DECV for helping students learn to think in an analytical way to be able to create an abstract mathematical model of a problem which contains multiple variables, as well as the algorithms to apply to the model to find a solution.

In addition to formally defining a solution, students are asked to justify their solutions by using mathematical principles to critically evaluate the efficiency and correctness of proposed solutions by deductive logic.

J12 How to write excellent multiple-choice items

Y2 - 12, Workshop, Commercial

Liz Spielman and Fiona Hay, NSW

Participants will be taught how to write and review multiple-choice items having been briefed on the principles of assessment, item analysis and various uses of visual stimuli. Each item will map to a framework linked to the Australian Curriculum. Participants will be given the opportunity to write items of varying difficulty to take back to school, gaining valuable feedback in the process. Those participants showing a creative flair and mathematical insight may be contacted to write items for ICAS.

J13 Books and numbers in a box

Y2 - 7, Workshop

Jude Ocean, RMIT University

This session shows you how to link maths activities with children's books. It's a great activity for that windy afternoon, the day before holidays, or when you're too busy to prepare but still want to do something worthwhile. In this session we'll look at a set of brightly coloured boxes, each containing two or three books, along with two or three maths activities that match the books. Maths materials can also be found inside the box. When allowed to use the boxes, children can choose to read, to do some maths, or both. A selection of fifteen books and activities will be provided for you to look at, and you'll be given the maths activities to take home with you, so that it's easy for you to set this up in your own classroom. Books and numbers in a box encourages kids who are interested in maths to do more reading, as well as encouraging good readers to do more maths.

J14 Menu maths: a model for making mathematicians

Y3 - 10, Workshop

Doug Williams

Perhaps if we offered real choice more often our students would have more success. It's about ownership. A menu is an opportunity for students to choose - and own - their mathematics learning. It is also an opportunity for teachers to combine the invitation to work like a mathematician with whole class modelling of Working Mathematically and practising mathematical skills. For much of this workshop you

SESSION J, Friday, 3.30pm-4.30pm (cont.)

will be able to choose your own mathematics. We will include a Pub Menu and Menu Maths Packs from Mathematics Centre in the mix, with small group and whole class investigation and time to reflect on the teaching craft.

J15 Algorithms and coding content in the new Victorian Curriculum

Y3 - 10, Workshop, Commercial
Megan Blanch, Mathspace

We've reached the end of the first year of teaching Algorithm and Coding as part of the new Victorian Mathematics Curriculum. Are you ready for next year? Do you want to learn more about this content and how to teach it in 2018? At Mathspace we pride ourselves on being able to quickly adjust to curriculum needs. In this workshop we will review the content of the new curriculum, share ideas and strategies for teaching Algorithm and Coding at multiple year levels. What will you get? You will walk away with free resources that can be used immediately in the classroom.

J16 Planning and assessing mathematical reasoning

Y3 - 6, Workshop, Repeat
Aylie Davidson and Leicha Bragg, Deakin University
Christine Borcek, St Kilda Primary School

There is growing consensus that the process of planning mathematics lessons is as complex as teaching them. Added to this are challenges in delivering learning experiences that promote mathematical reasoning. This workshop explores key aspects that supported teachers in planning mathematics lessons with a reasoning focus in mind. Participants will examine various planning documentation explained by the teacher presenter. Participants will also have opportunities to view actual lesson footage and work samples that supported teachers in noticing and assessing reasoning as it took place.

J17 Get more girls involved with STEM with Adobe

Y4 - 12, VCAL, Workshop, Commercial
Tim Kitchen, Adobe

Linking Adobe's amazing array of digital creativity tools to the teaching of STEM is a great way to attract more girls to what traditionally has been an area dominated by boys. This hands-on session, run by Dr Tim Kitchen (Adobe's Senior Education Specialist for Asia Pacific and former teacher at Strathcona Baptist Girls Grammar School), will focus on how some of Adobe's free mobile apps can be used to make STEM content more attractive to girls.

J18 Differentiation without technology: using enrichment problems for Stages 3 and 4

Y4 - 8, Workshop, Repeat
Anne Prescott and Pauline Kohlhoff, APSMO Inc

In this hands-on interactive workshop we will explore how well-constructed problems can be used for teaching students who are at different stages of mathematical development. Using a variety of solution methods and related classroom activities based on questions from the APSMO Maths Games and Maths Olympiads, we will investigate the enhancement of differentiation in teaching mathematics. APSMO Inc. is a not-for-profit organisation.

J19 How to teach decimals better

Y4 - 9, Workshop
Michael O'Reilly

This presentation is based on the MY Numeracy Leader Decimals Module, plus much more. We will look at an easy to implement diagnostic test to identify common decimals misconceptions held by students. These misconceptions will be explored, as will a range of teaching strategies to address them. The concrete teaching aid, Linear Arithmetic Blocks (LABs), will be demonstrated. These can be constructed by participants and used to teach place value and decimals. Participants will receive copies of files and handouts, as well as detailed instructions for constructing the LABs.

J20 Is perfect differentiation impossible? These teachers found a way AND saved marking/prep time

Y5 - 10, Lecture, Commercial/Repeat
Luke D'Astoli, Maths Pathway

Do your classes have 25 students with 25 different learning needs? Catering to this properly would take a superhero teacher, and none of us can differentiate perfectly on our own. However, through the Maths Pathway teaching and learning model, there are now over 1000 Australian teachers meeting the individual needs of their students every day. During this talk you'll discover the system and hear the real life classroom and staff room stories of some of these superheroes.

J21 The game of SET

Y5 - 12, Workshop
Amie Albrecht, University of South Australia

SET is a game that is more than just fun to play. Each card shows a design with four attributes. A SET is a group of three cards where each attribute is either the same or different

across all cards. Along with encouraging logical and spatial reasoning skills, SET inspires many mathematical questions from players of all levels—from primary students to research mathematicians. In this workshop we'll experience the mathematical thinking needed when exploring the game. We'll also uncover some of the mathematical ideas in SET which are adaptable to a range of year levels.

J22 Using technology to provide quality feedback

Y5 - 12, Workshop, Repeat/Commercial
Thomas Moore, Maths Pathway

In this presentation we will look at how you can use Google Drive and a flipped learning approach to deliver high quality feedback videos. We will also discuss the idea of 2 due dates and how you can get students to provide each other with high quality feedback.

J23 Forming hypothesis – data collections and using online free Google Apps

Y5 - 12, VCAL, Computer Workshop, Repeat
Iqbal Hossain, The Grange P-12 College, VIC
Fahmida Hossain, Scholarship Assessment Training

This session will focus on how students will frame a hypothesis on a contemporary issues and collect primary and secondary data, then compare their findings vs hypothesis. Students prepare and run survey to collect data. Part of the discussion will cover some key points in designing surveys. This will include the use Google Apps (Google Form – run online survey and analyse survey result; Google Slides – create and edit online free presentation). Finally, how students manipulate this data to support interpretation and apply computational skills to analyse the data and derive a conclusion, will be shown using different work examples.

J25 Thinking outside the strand

Y5 - 9, Lecture, Repeat
Helen Booth, AMSI

The amount of content can, at times, seem overwhelming, particularly at middle years. Is there a more efficient way for teachers to cover all the content required while ensuring depth and breadth? This presentation looks at ways to work smarter rather than harder by teaching across strands, teaching number in context and using skills and knowledge learnt in investigations.

J26 Cloud-based planning, tracking and reporting for easy differentiation in today's classrooms

Y6 - 12, VCAL, Workshop, Commercial/Repeat
Bill Murray, Mentone Girls Secondary College and Victoria Pichler

The cloud-based Classroom Organiser enables teachers to prepare every individual lesson plan required for the year and to track student progress shortly after lesson completion. Student assessments can be transferred to students and parents (using separate log-ins) within a few days of test completion. The system enhances student self-paced learning and encourages students to work through various levels of achievement. The system helps teachers to differentiate to meet individual student needs for consolidation or extension. The planning and tracking is easy to organise and data can be imported or exported in standard formats to suit existing systems.

J29 ADUSU ALGEBRA™

Y7 - 12, VCAL, Workshop, Commercial
Ruth Adusu, Carinya Christian School, NSW

Ruth Adusu has been a full-time teacher for 30 years before developing a system that allows students to physically build and manipulate expressions, equations and inequalities. Adusu Algebra™ simplifies the many approaches to a variety of questions down to one or two simple rules. It allows students to explore questions from substitution and collecting like terms through solving equations and inequalities and up to simultaneous equations. The kit and technique support correct mathematical working and have improved student recall. It avoids or eliminates common misunderstandings and provides immediate feedback. A student kit will be provided for use in the workshop.

SESSION J, Friday, 3.30pm-4.30pm (cont.)

J30 Shifting the narrative: DET, MAV and Chaffey Secondary College partnership program

Y7 - 9, Workshop, Repeat
Megan Lewis, Chaffey Secondary College and Ann Kilpatrick

This presentation will unpack how Chaffey Secondary College moved away from 'how bad the results are', to a proactive and positive framework in working collectively with The MAV through the fully funded DET Strategic Partnerships Program, looking to improve student motivation, engagement and achievement in mathematics. This is a trail blazing case study, which commenced in July this year and participants will be taken through the journey, the key players, the strategies and the results so far.

J31 Harry Houdini and maths

Y9 - 11, Workshop, Repeat
Chris Ireson

Learn how to perform a simple magic trick to inspire your students and then build a project based on the outcome of the trick and more. Bring along your TI-Nspire CAS Calculator to write User Defined Functions and use the Notes Page to make a unique project for each student.

J32 What is coding? An introduction and some basic resources.

Y5 - 8, Workshop
Helen Haralambous, MAV

This workshop is aimed at upper primary to lower secondary year level teachers who have had no prior experience with coding. The workshop will cover a basic overview of coding and participants will trial a selection of examples and activities. A key focus will be algorithmic thinking and will include participants representing algorithms via flow-charts. Participants are required to have a smart phone or tablet.

J33 Understanding finance - the General and Further Mathematics courses

Y10 - 12, Lecture
Rod Vermay

Knowledge and thorough understanding of relevant skills will help to maximise student success in the compulsory Financial Modelling module in Further Mathematics 3 and 4. This lecture is an updated version of a popular 2016 session and will refer to questions from the June 2017 NHT Further Mathematics examinations. We will explore a program that begins with consumer mathematics in General Maths 1 and 2 as an introduction to an expanded understanding of loans and investments in Further Maths 3 and 4. The aim of this program, and this lecture, is to develop students' understanding, confidence and ability in skills and techniques that will be applicable to them all; not just in exams, but in lifestyle decisions. Application of the calculator financial solver app will be included.

J34 FREE resources

Y7 - 12, Workshop, Commercial
Peter Fox, Texas Instruments

Free activities on the TI website, Monopoly, non-transitive dice, kicking some AFL goals, filling vases in the name of calculus and assessment the choice is yours. In this workshop participants will be able to take away lots of free activities applicable to students in years 7 through to 12, the choice is yours.



**PRESENTER
LISTING**

PRESENTER LISTING A-Z

- Nadia Abdelal: D40
Ruth Adusu: B43, J29
Amie Albrecht: E36, J21
Ben Allen: C21, E21
Felicity Ames: G43
Lauren Anderson: D3, G3
Michelle Anderson: E23, H21
Rodney Anderson: B29
Peggy Ashton: B-C2
Catherine Attard: A1
Rachel Azzopardi : D8
Michael Bairstow: B18, I5
Roland Bairstow: B35
Lei Bao: D15, H13
Caroline Bardini: E16
Helen Barker: E23, H21
Rohan Barry: G-H10
Craig Bauling: C36, I35
Tom Beardsworth: D3, G3
Craig Becker: B-C4, I-J2
Adrian Berenger: G40, J24
Alex Berry: B4
Ian Berryman: G-H10
Stephanie Black: D4, I2
Megan Blanch: B20, J15
Jacinta Blencowe: D10, I7
Anna Bock: H2
Luke Bohni: B-C11
Helen Booth: C30, J25
Christine Borcek: G38, J16
Sarah Bortolotto: C15
Jennifer Bowden: B5, D6, G5, I4
Nat Bradshaw: B41, E31, H28, I39
Leicha Bragg: G38, J16
Jen Briggs: H8
Jill Brown: D7
Ian Bull: B27, D37
Joanne Burke: I38
David Butler: A2, D41, G28, I43
Tim Byrne: E26
Anita Carey: B17, G16
Greg Carroll: D27, I20
Tim Carruthers: E33
Emma Castelow: B-C3, G-H2
Jennifer Churcher: E8, G8
Mike Clapper: C24, E22, G26, I21
Jenny Clark: D5, J1
Fiona Clarke: H19
David Clarke: F2
Jayde Clayton: B7
Peter Collins: C34, E35
Bree Collins: D1, E1
Tim Colman: B6, E7
Rebecca Cooper: I38
Ellen Corovic: C8, H7
Jonathan Crabtree: D29
Andrew Crisp: B2, G2
Johanna Crisp: D24, I17
Luke D'Astoli: D32, J20
Catherine Davidson: B7, H5
Aylie Davidson: G38, J16
Stephanie Davies: E2, I1
Anthony John Davies: G-H4
Christopher Daxecker: D4, I2
Sanjin Dedic: B41, E28, I39
Martin Demonsthenous: G-H5
Shane Dempsey: G39, H38
Ben Dennis: B23, G24
Lana Dimitrijevic: J5
Norman Do: F3, I38
Jenny Dockeary: E4, H5 Brian
Doig: B1, E41, G1
Ann Downton: H17
Hayley Dureau: A4, B36
Anjana Dwivedi: B-C6, G-H6
Shane Dye: E15, G17, I6
Kin Eng Chin: E16
Catherine Epstein: C7, G18
Michaela Epstein: D11, H10
Emma Fawcett: D47
Clare Feeney: I34
Sarah Ferguson: F1
Paul Fielding E20
Dan Finkel: A3, D14, F4
Tina Fitzpatrick: G-H4

Peter Fox: G36, J34
 Tristan French: I8
 Alyssa Galea: I5
 Ming Gao: H35, I30
 Mark Gleeson: G-H5
 Sherryl Gomm: C12, I9
 Kerri Goode: D24, I17
 Georgia Gouros: C18, J11
 Britt Gow: B-C3, G-H2
 James Gray: B14, D19, E12
 David Greenwood: H30
 Susie Groves: G43, E4
 VJ Gunawardana: C27, D34
 Sharon Gunn: H37
 Jan Halliday: H24
 Pamela Hammond: D22, E17
 Stephen Hanlon: C26, G27
 Samuel Hannah: G-H9
 Abby Hansen: G-H4
 Helen Haralambous: D6, E43, I4, J32
 Anthony Harradine: D46, G-H11
 Rebecca Harris: E9, J6
 Fiona Hay: J12
 Sandra Herbert: B17, D25, G16, I18

 Daniel Hernandez: E33
 Brendan Hodge: G6, J4
 Jan Honnens: G-H7

 Sarah Hopkins: A5, E44
 Iqbal Hossain: E25, J23
 Fahmida Hossain: E25, J23
 Bryn Humberstone: C15
 Kristin Humphreys: C29
 Chris Ireson: E38, J31
 Geetha James: E30
 Trish Jelbart: F5, G9
 Anna Kapnoullas: E42, G44
 Ben Kelso: B4
 Vicky Kennard: C2, H11
 Ann Kilpatrick: D44, I37, J30
 Tim Kitchen: C38, J17
 Pauline Kohlhoff: B22, J18
 Richard Korbosky: C19, D13, H18
 Adam Kruger: C32, H27
 Melissa Lake: D9
 Dean Lamson: C17
 Brian Lannen: B29
 Lynne Laursen: B-C6, G-H6
 John Lawton: D31,
 Cameron Lee: C6
 David Leigh-Lancaster: E34, I29
 Antje Leigh-Lancaster: B38, H29
 Megan Lewis: H36, J30
 Sharyn Livy: H17
 Bern Long: B8
 Esther Loong: D47
 Andrew Lorimer-Derham: D21, G19

 Ollie Lovell: B32
 Jim Lowe: I28
 Julian Lumb: E33
 Alastair Lupton: B40, E37, G37, H34
 Amy MacDonald: F6
 France Machaba: B42, E39
 Caitlin Mahony: E32
 Kate Maiden: C1
 Jan Mann: H35, I30
 Russell McCartney: B10, C11
 Chris McCarty: G-H9
 Bernie McGrath: E27, I27
 Janine McIntosh: G10
 Ainslie McIntosh: B-C9
 Sara McKee: D9,
 Leanne McMahan: H2
 Kevin McMenamin: E13, G13, H15
 Karen McMullen: B37, G34
 Allason McNamara: B15, C17
 Geoffrey Menon: B34, G31
 Nicole Merlich: F5
 Carmel Mesiti: F2
 Sanjeev Meston: B-C5, G-H3
 Kristy Miller: G6, J4
 Terence Mills: C35, G35
 Thomas Moore: B26, C25, D33, H23, I23, J22,
 Jan Morahan: B7
 Anthony Morphett: H37

PRESENTER LISTING A-Z (cont.)

- Frank Moya: B-C8
Bill Murray: D48, J26
Deborah Murrell: H26
Rebecca Naylor: E2, I1
Damien Nicholson: H40
Karim Noura: E11, J7
Jude Ocean: H12, I26, J13
Liam O'Connor: B23, G24
Michael O'Connor: D23, E18, I41
Patricia O'Hara: H9
Mel O'Reilly: D7
Michael O'Reilly: B-C7, I24, J19
Kath O'Shea: D17, I11
Jennifer Palisse: B-C11
Mary Papp: B15, D20, I14
Chris Paragreen: E27, I27
Ursula Parker: B34, G31
Sabine Partington: D45
Suzy Pask: G22
Catherine Pearn: C4, D30, G23, H6
June Penney: E4, H5
Nicola Petty: E15, G17, H31, I16
Trang Pham: B16
Holly Phillips: I5
Victoria Pichler: D48, J26
Robyn Pierce: D30, G23
Chantelle Polkinghorne: C21, E21
Anne Prescott: B22, J18
Celeste Pryke: D18
Dheepika Rathana Kumar: G4
Tracey Rogers: C29
Angela Rogers: B8, H16
Eugene Roizman: E29
Paul Rowland: B-C1, G-H1
Raymond Rozen: J10
Vanessa Rule-Paddle: D38, H29
Scott Rumble: C32, H27
Norrian Rundle: B-C7, I24
James Russo: C5, E44
Toby Russo: C5
Haylie Saarinen: I8, J5
Laura Sansonetti: D7
Carly Sawatzki: D28, E24
Dietmar Schaffner: C33, H32
Zoe Schaffner: C33, H32
Sue Scott: B12, C13
Shane Scott: I40
Katherine Seaton: B31, D39, I31
Jade Seddon: H8
Wayne Semmens: I12, J9
Nick Serafidis: H25
Aimee Shackleton: I33
Justine Shelley: C20, I19
Elizabeth Shepherd: G33, H33
Greg Sheridan: G-H12
Dianne Siemon: B25, E10
Kathryn Sobey: D11, H10
Liz Spielman: J12
Jim Spithill: H24
Andrew Spitty: D2, H1
Val Steane: C28, H25
Max Stephens: C22, D30, G23, H20
Rebecca Stewart: J3
Brian Stokes: B13, G14
Karen Sturzaker: E19
Peter Sullivan: E6, I42
Nancy Surace: B-C9
Philip Swedosh: C17
David Symington: B16
Wendy Taylor: B32, D45
Ryan Tebble: B-C5, G-H3
Chris Terlich: B10, C11
Karyn Thomas: G6, J4
George Tissera: D45
Dave Tout: A6, I - J1
Ross Turner: A6
Joanna Tutos: B24, C23, G25, H22
David Tynan: B-C10, D - E1
Colleen Vale: D25, I18
Chris Velis: B20
Rod Vermay: J33
Jennifer Vincent: B-C2
Nadia Walker: B5, C9, G5
Roger Walter: D12, I32

Roger Wander: D43, I36

Charlie Watson: C14, D16,
E14, G12

Sean Webb: B10, C11

Leah Whiffin: B12, C13

Wanty Widjaja: E8, G8

Charlotte Wilkinson: C12, I9

Doug Williams: B19, C10, D36,
E3 G15, H4, I15, J14

Ian Willson: C37, H39

Joe Wilson E20

Neale Woods: B33, I10

Aimee Woodward: G42

Joe Wright: B24, C23,
G25, H22

Paul Wright: B24, C23, G25,
H22

Meghann Wurm: H19

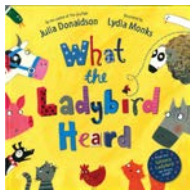
Chan Yew Fook: I13, J8

Alexander Young: B3, E5

Simone Zmood: B28, H30

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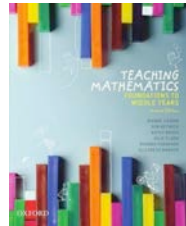


WHAT THE LADYBIRD HEARD

F-6

'Oink!' said the cats ...With all the mooing and hissing and baaing and clucking, the farmyard is full of noise. But when Hefty Hugh and Lanky Len hatch a plot to steal the fine prize cow, it's the quietest animal of all who saves the day! Spot the glittery ladybird on every page of this wonderful rhyming tale.

\$13.13 (MEMBER)
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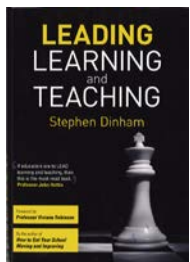


TEACHING MATHEMATICS: FOUNDATIONS TO MIDDLE YEARS, SECOND EDITION

F-9

This book connects readers to the bigger picture of mathematics. This comprehensive resource is designed to help pre-service teachers gradually build mathematically knowledge and become confident about teaching the subject to a range of age groups, in diverse learning environments. The book's unique structure explores the different stages of how children learn maths and how to teach maths, before drilling down to the specific strands and skills by age group. Updated to draw on the revised Australian Curriculum, the second edition is rich with student work examples, practical activities and a wealth of teaching and learning tools to ensure pre-service teachers feel positive about mathematics and their role in teaching it.

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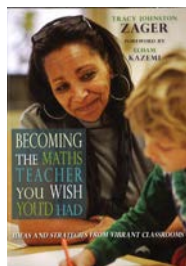


LEADING, LEARNING AND TEACHING

K-VCAL

The core purpose of schools and educators must be the successful facilitation of teaching and learning – and to do this effectively, teachers must also be leaders. Stephen Dinham gives an authoritative, in-depth examination of the field of instructional leadership. Building on extensive research in Australia and around the world, this book examines the importance and impact of instructional leadership. Key themes include successful change management, the effectiveness of teacher professional development and the importance of evidence and the use of data.

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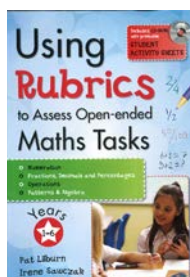


BECOMING THE MATHS TEACHER YOU WISH YOU'D HAD

F-9

While mathematicians describe maths as playful, beautiful, creative and captivating, many students describe maths class as boring, stressful, useless and humiliating. Author Tracy Zager spent years with highly skilled maths teachers in a diverse range of settings and year levels. This book is jam-packed with new thinking from these vibrant classrooms. You'll grapple with big ideas: How is taking risks inherent to mathematics? How do mathematicians balance intuition and proof? How can teachers value both productive mistakes and precision? You'll find dozens of practical teaching techniques you can try in your classroom right away - strategies to stimulate students to connect ideas; rich tasks that encourage students to wonder, generalise, conjecture and persevere; and routines to teach students how to collaborate.

\$65.45 (MEMBER)
\$81.81 (NON MEMBER)



USING RUBRICS TO ASSESS OPEN-ENDED MATHS TASKS

1-6

This book provides teachers with 36 open-ended number tasks and rubrics for numeration, fractions, decimals and percentages as well as operations, patterns and algebra. This resource provides maths teachers with a wide range of material to support assessment and learning.

With user-friendly rubrics and student work samples taken directly from the classroom, this book will help you gain a better understanding of your students and allow you to develop more relevant programs and activities to help them achieve their best.

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