



THE MATHEMATICAL  
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**MAV23**  
**CONFERENCE**

30 NOV & 1 DEC 2023

# AIMING HIGH

Continual improvement in mathematics education



**60<sup>th</sup> Annual Conference**

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## WELCOME TO MAV23



**Welcome to MAV23 –  
Aiming high: Continual  
improvement in  
mathematics education**

On behalf of the MAV Board and the conference committee I invite you to the 60th Annual Conference (MAV23) in Melbourne from Thursday 30 November – Friday 1 December 2023.

The focus of MAV23 is on continual improvement in mathematics education.

All students have the right to leave school with a high level of numeracy, and the mathematics skills, knowledge, and positive dispositions to support them in further study, and their professional and civic lives.

Many factors need to come together for success, and we recognise that teaching and learning is complex, and a range of priorities and factors must be effectively implemented to bring about improvement. Teachers and leaders must consider the evidence of what constitutes quality numeracy and mathematics teaching, learning, and assessment practices. To determine this requires them to implement, reflect on and refine proven and innovative approaches, and ensure that student needs are met within their unique school context.

We are committed to focusing on teaching students and understand that numeracy and mathematics teaching is proficiency-rich, helping to develop independent users of mathematics. Formative assessment must be part of the approach, to be responsive to each student's needs as they progress, because all students deserve to experience productive challenge, high quality learning experiences, and true engagement and enjoyment in mathematics.

Join us at MAV23 to explore how we raise the bar and improve our approaches to lead improvement in student, school, and system outcomes.

- Ann Downton, Conference Convenor

## CONTENTS

KEYNOTES	Page 5
SESSION SUMMARY	Page 10
SESSION DETAILS	Page 26
PRESENTERS LIST	Page 107
GENERAL INFO	Page 110
SPONSOR AND EXHIBITORS	Page 114

## SCHEDULE

### Thursday 30 November 2023

8am - 9am	Registration
9am - 9.15am	Opening and welcome
9.15am - 10.15am	Keynote presentations
10.15am - 10.50am	Morning tea
11am - 12pm	Session A
12.10pm - 1.10pm	Session B
1.10pm - 2pm	Lunch
2pm - 3pm	Session C
3.10pm - 4.10pm	Session D
4.10pm	Networking drinks and nibbles
5pm	End of day 1

### Friday 1 December 2023

8am - 9am	Registration
9am - 9.15am	Opening and welcome
9.15am - 10.15am	Keynote presentations
10.15am - 10.50am	Morning tea
11am - 12pm	Session E
12.10pm - 1.10pm	Session F
1.10pm - 2pm	Lunch
2pm - 3pm	Session G
3.10pm - 4.10pm	Session H
4.10pm	Conclusion of conference

### Stay connected



# KEYNOTES: THURSDAY

## PRESENTERS



### TRACY LOGAN

#### TEACHING AND LEARNING SPATIAL REASONING IN THE EARLY PRIMARY YEARS.

Tracy Logan, PhD, is a Senior Lecturer in the Faculty of Education at the University of Canberra. She has a deep knowledge of, and passion for, research-informed education. With more than 18 years' experience across classroom-based practice and research, her knowledge base includes mathematics and STEM. As the Deputy Director of the STEM Education Research Centre, Tracy has worked on key projects including Early Learning STEM Australia (ELSA), re-conceptualising how STEM is considered in pre-schools and schools, and Australian Research Council funded research on spatial reasoning and mathematics. All this work has been classroom-focused, with engagement with teachers at the core of the research.



### PETER FOX AND DANIJELA DRASKOVIC

#### ACCELERATION: TRANSPOSING BREADTH FOR TIME AT THE EXPENSE OF UNDERSTANDING

Peter Fox is passionate about mathematics, education and the way technology can be used to engage, excite, and enhance student understanding. Peter taught high school mathematics for 25 years. In his first year of teaching (1990) he wrote machine coded routines that connected a bicycle to a computer so his mathematics and physics students could interact with distance, speed, and acceleration - time graphs. He has used data logging, video analysis and interactive media for many years to help motivate and inspire students. Peter has also worked as a project manager at the University of Melbourne, taught DipEd students at Monash University, worked on VCAA course review and examination panels, provided resources and professional development in various regions around the world as they move to incorporate a range of technologies in the mathematics classroom. Peter works with Texas Instruments providing professional development, website, and product development. He was a part of the team that supported the development of TI-Nspire and TI-Innovator and continues to develop free resources for teachers and students.



Danijela Draskovic is a Secondary Mathematics Education Consultant at MAV. Danijela founded the Victorian Coding Challenge (VCC), runs the VCE Revision Program, the Maths Talent Quest (MTQ) and is an active contributor to MAV's Professional

Learning offerings. Danijela has taught mathematics and physics and loves being in the classroom. She believes that most people can engage and have success in mathematics by approaching the subject in a holistic and meaningful way. Danijela is passionate about exploring the affordances of technology in enhancing teaching and learning by modelling concepts in visual and dynamic ways. She is an accredited trainer for Texas Instruments and has authored content for textbooks. As a mum of two young boys, Danijela is passionate about mathematical connections between early years and primary school and how they impact a person's journey through secondary school and later in life.

*This keynote presentation is supported by*



### OLIVER LOVELL

#### SELF-REGULATED LEARNING: SCAFFOLDING INCREASING LEARNER INDEPENDENCE FOR HIGHER ACHIEVEMENT

Oliver (Ollie) Lovell is a maths teacher at Brighton Grammar school, senior researcher within the Crowther Centre, the host of the popular Education Research Reading Room, director of Steplab Australia. He is also the author of two books, Cognitive Load Theory in Action and Tools for Teachers. Ollie is an adjunct lecturer at La Trobe University, is currently completing his PhD on the topic of self-regulated learning through the University of Freiburg, Germany.

*This keynote presentation is supported by*



### CARLY SAWATZKI

#### STUDENTS WANT TO LEARN ABOUT FINANCE IN MATHEMATICS. SO, WHAT CAN WE DO DIFFERENTLY?

Dr Carly Sawatzki is a teacher educator and educational researcher in Deakin University's School of Education. She has more than 15 years' experience working with pre-service and practising teachers (including out-of-field and non-specialist teachers of mathematics) across primary and secondary courses. Carly's work is distinctly "real world" and aims to gently influence the way teachers think about educating young people for active and informed citizenship. She is internationally recognised for her classroom research which explores how young people develop numeracy and financial capability within families, communities, and schools. Carly has led research and curriculum consultancies for Australian, State and Territory education authorities. She is a thought-provoking presenter who draws on educational research to challenge thinking, promote critical conversation, and inspire innovation. To find out more, go to [www.carlysawatzki.com](http://www.carlysawatzki.com).

*This keynote presentation is supported by*





# KEYNOTES: FRIDAY

## PRESENTERS



**NICOLA YELLAND**

**EARLY MATHEMATICAL EXPLORATIONS: CONNECTING NUMERACY WITH EVERYDAY LEARNING**

Nicola Yelland is the Professor of Early Childhood Studies in the Melbourne Graduate School of Education at the University of Melbourne. Her teaching and research interests are related to multimodal learning. Nicola has worked in East Asia and examined the culture and curriculum of early childhood settings. Nicola's work engages with educational issues in varying social, economic and political conditions using multidisciplinary perspectives.



**NADIA WALKER**

**CURRICULUM RESOURCES AS A VEHICLE FOR CHANGE: CAN THEY MAKE A DIFFERENCE?**

Nadia Walker is the Mathematics Advisor K-6 for the NSW Department of Education. Nadia has been involved in curriculum change and reform projects in two states, working for both the Victorian Department of Education & Training and the NSW Department of Education. As NSW education undertakes its biggest reform in 30 years, her work as a mathematics curriculum leader and policy advisor has been focused on developing curriculum resources to support teachers through the change process, as a tool for professional learning and to influence pedagogical change. Nadia has been a classroom teacher, pre-service tutor at Melbourne University, research assistant at Monash University and a mathematics consultant. Throughout 2016 – 2018, Nadia was involved with the reSolve: Mathematics by Inquiry as the Victorian Outreach Officer and resource developer. Nadia is completing a Master of Education at Charles Sturt University focussed on Issues in Professional Learning and Leading Professional Learning Organisations.



**CHRIS MATTHEWS**

**AIMING HIGH: WHAT DOES THIS MEAN FOR INDIGENOUS EDUCATION IN MATHEMATICS?**

Professor Chris Matthews is from the Quandamooka people of Minjerribah (Stradbroke Island) in Queensland Australia. Chris received a PhD in applied mathematics from Griffith University and was a Senior Lecturer in applied mathematics at the Griffith School of Environment, Griffith University. Over the last ten years, Chris developed a deeper interest in mathematics education for Aboriginal and Torres Strait Islander learners and exploring the connections between mathematics and Aboriginal and Torres Strait Islander knowledges. Chris is the Chair of the Aboriginal and Torres Strait Islander Mathematics Alliance (ATSIMA) that aims to transform mathematics education for Aboriginal and Torres Strait Islander learners. Chris is also the Associate Dean (Indigenous Leadership and Engagement) in the Science Faculty at University Technology of Sydney (UTS). As part of this role, Chris will be leading a team of academics to transform the Science curriculum to meet the Indigenous Graduate Attribute and develop a Community of Indigenous STEM professionals at UTS.

*This keynote presentation is supported by*



**MICHAEL MINAS**

**STANDING ON THE SHOULDERS OF PRIMARY TEACHERS- LESSONS FOR A SECONDARY CONTEXT**

Michael Minas is the director of Love Maths ([www.lovemaths.me](http://www.lovemaths.me)) and has worked in education for over 20 years. His areas of interest include problem solving and student engagement and in 2018, Michael's ability to shape learning was recognised when he won a CHOOSEMATHS Teaching Excellence Award.



**ROBERT KAPLINSKY**

**INTERNATIONAL PRESENTER  
HOW I BLEND BUILDING THINKING CLASSROOM AND THE 5 PRACTICES**

Robert Kaplinsky has been an educator since 2003 as a classroom teacher, teacher specialist for Downey Unified School District, instructor for the University of California, Los Angeles (UCLA), and presenter at conferences around the world. He co-founded the website Open Middle, has been published in Edutopia and Education Week, is the author of Open Middle Math: Problems That Unlock Student Thinking, and created the #ObserveMe movement. He's also the founder and president of Grassroots Workshops.

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## MAV MEMBERSHIP



The Mathematical Association of Victoria (MAV) promotes the importance of mathematics to society. MAV has over 1700 members from all sectors of education including individuals, schools, universities. We provide membership benefits to a growing network of over 17,000 mathematics educators and reach over 60,000 educators, students and parents across metropolitan and regional Victoria via our events each year. MAV is the peak professional body for mathematics educators in Victoria.

MAV works with teachers and school leaders to enhance student outcomes in mathematics and numeracy, better preparing students for their personal, professional and civic lives. Our role is to support educators in developing and delivering curriculum and programs that challenge our students to become the future of mathematical creativity and innovation.

We develop educator skills in implementation of evidence-based and cutting edge teaching and learning approaches. We work directly with students to increase their engagement in mathematics through games days, our Maths Talent Quest, STEM days, mathematics camps, VCE revision support, and other activities.

We are educational experts and leaders, supporting the future of mathematics education from early childhood to Year 12.

To stay up-to-date, subscribe to the **MATRIX** e-newsletter at [www.mav.vic.edu.au](http://www.mav.vic.edu.au).



There is a member category for you:

- Individual member (teachers, academics, student teachers and those with an interest mathematics education)
- Institutional member (primary and secondary schools and early childhood centres)
- Associate member (industry partners or resource providers)

Visit the MAV website for more information, including member benefits, [www.mav.vic.edu.au](http://www.mav.vic.edu.au).

## HOW I CAN I GET INVOLVED WITH MAV?

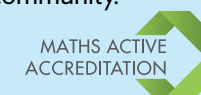
MAV depends on its members for success. Extend your professional learning and get involved in MAV's activities:

- present at MAV's annual conference
- join our online community
- write for MAV's journals
- join committees
- develop resources
- pilot mathematics initiatives
- develop a PD event at your school or venue
- judge the MTQ awards, or
- organise a Maths Games Day for your region.

## MATHS ACTIVE ACCREDITATION FOR YOUR SCHOOL

MAV's Mathematics Active Schools initiative is a way to recognise and support schools who demonstrate excellence in learning and teaching practices in mathematics.

- Publicise your schools Maths Active Schools certification and demonstrate to your school community that mathematics is enjoyable and highly valued.
- Receive regular activities and information from MAV to promote maths to your school community.
- Be invited to participate in special Maths Active School events.





# SESSION SUMMARY: THURSDAY

THURSDAY 30 NOVEMBER 2023

### SUB-THEMES

Improving assessment, through balancing formative and summative approaches	Exploring evidence for improving student achievement outcomes	Improving positive dispositions for teachers and students, valuing mathematics and its applications	Unpacking high quality teaching, learning, and resources	Focusing on the proficiencies at the heart of mathematics and numeracy learning	Multiple sub-themes
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Room	Keynote 9.15am - 10.15am	MORNING TEA 10.15am- 10.50am	Session A 11am - 12pm	Session B 12.10pm-1.10pm	LUNCH 1.10pm - 2pm	Session C 2pm-3pm	Session D 3.10pm-4.10pm
Room 1	Teaching and learning spatial reasoning in the early primary years. <i>Dr Tracy Logan</i>		Implementing spatial reasoning into your classroom <i>Dr Tracy Logan</i>	FULL F-2: building strong place value understanding <i>Elizabeth Irwin</i>		3 2 1 Launch... the struggle is real <i>Molly-Rose Clifton-Williamson, Libby Vanderwyst and Hung Vo</i>	Happy numbers: an enjoyable number investigation! <i>Peter Sanders</i>
Room 2	Aiming high by leading well: Strategies for school mathematics leadership that challenges mathematics learning <i>Matt Sexton</i>		Planning for teaching with tasks and recognising polygons <i>Sharyn Livy</i> <i>The presenter has cancelled this session</i>	The critical importance of consolidating learning <i>Peter Sullivan</i>		Sequencing the learning of measurement concepts through challenging tasks <i>James Russo and Jane Hubbard</i>	What can a drawing say? Stories from F-2 students' classrooms <i>Ellen Corovic and Ann Downton</i>
Room 3	Acceleration: Transposing breadth for time at the expense of understanding <i>Peter Fox and Danijela Draskovic</i> <i>Supported by</i> 		Is this still 3? A story of subitising in Foundation <i>Georgia Dimitrovski and Erika Starcic</i>	Developing a whole school approach to mental computation <i>Ange Rogers</i>		Effective teacher questioning to elicit mathematical reasoning <i>Yun Chen</i>	FULL Ask and listen: using formative assessment and questioning to improve student achievement <i>Cassandra Lowry</i>
Room 4	FULL Self-regulated learning: Scaffolding increasing learner independence for higher achievement <i>Oliver Lovell</i> <i>Supported by</i> 		Student goals based on the mathematics online interview (MOI) <i>Hannah Marino</i>	Inquiry cycles – a session designed for primary PLC leaders and teachers <i>Russell McCartney</i>		An informal introduction to computational thinking <i>David Leigh-Lancaster and Antje Leigh-Lancaster</i>	FULL But where is the explicit teaching in rich tasks? <i>Marissa Cashmore</i>
Room 5	Students want to learn about finance in mathematics. So, what can we do differently? <i>Dr Carly Sawatzki</i> <i>Supported by</i> 		These are a few of my favourite things <i>Nadia Walker</i>	A further investigation to introducing the equal sign in China <i>Jiqing Sun and Echo Gu</i> <i>Cancelled due to low numbers</i>		FULL There are many ways to teach maths well. <i>Aylie Davidson</i>	Anticipating student learning <i>Michael Logan, Will Davey and Catherine Shepherd</i>

# SESSION SUMMARY: THURSDAY (cont.)

THURSDAY 30 NOVEMBER 2023

## SUB-THEMES

Improving assessment, through balancing formative and summative approaches	Exploring evidence for improving student achievement outcomes	Improving positive dispositions for teachers and students, valuing mathematics and its applications	Unpacking high quality teaching, learning, and resources	Focusing on the proficiencies at the heart of mathematics and numeracy learning	Multiple sub-themes
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Room	Session A 11am - 12pm	Session B 12.10pm-1.10pm	LUNCH 1.10pm - 2pm	Session C 2pm-3pm	Session D 3.10pm-4.10pm
Room 6	<b>FULL</b> Strategies to enhance successful problem solving <i>Catherine Epstein/Rodgers and Antje Leigh-Lancaster</i>	Eight ways to (maths) play <i>Alex Box</i>		Stop, look and listen: whole school change from the middle <i>Emily Glen and Kate Molloy</i>	Exploring muddy city tasks in specialist setting in middle years <i>Jenny Slusher</i> <i>Cancelled due to low numbers</i>
Room 7	<b>FULL</b> First 10 days of maths: establishing a consistent learning culture <i>Christian Terlich and Steve Lester</i>	Let's run with it: continuous maths content learning <i>Stacey Lamb</i>		Moving students from additive to multiplicative thinkers <i>Renee Ladner</i>	Introducing the most versatile maths manipulative: the Rekenrek! <i>Amy How</i> <i>The presenter has cancelled this session</i>
Room 8	Inquiry based pedagogies: Where to from here? A collaborative discussion. <i>James Russo, Jane Hubbard and Jessica Kurzman</i>	Letting go of traditional views of teaching mathematics <i>Sally Jones and Charelle Zammitt</i>		A strategy approach to teaching and learning <i>Paul Staniscia</i>	<b>FULL</b> Checking in on learning - the power of ongoing assessment <i>Ruth Staniscia</i>
Room 9	<b>FULL</b> Coding / pseudo-coding for algorithmic thinking, computational mathematics and STEM <i>Sanjeev Meston</i>	<b>FULL</b> Specialist Mathematics: vector calculus and new vector content <i>Peter Flynn</i>		Snakes alive! - An introduction to programming using Python. <i>Tim Grabovszky</i>	<b>FULL</b> One college's journey into tackling numeracy across the secondary curriculum <i>Samantha Horrocks, Benjamin Cooper and Mark Collins</i>
Room 10	<b>FULL</b> Using CAS calculator effectively and efficiently in VCE Specialist Maths. <i>Trang Pham</i>	Logo Turtle graphics programming using Python and TI-Nspire <i>Raymond Rozen and Shane Dempsey</i>		<b>FULL</b> A look at teaching General Mathematics <i>Mark Ljubic and Andrew Greville</i>	Strengthening the connection between quadratics equations and parabolas <i>Echo Gu and Jiqing Sun</i>
Room 11	<b>FULL</b> Even more puzzles, problems and tricks of the trade <i>Mike Ristovsky and Taylor Pervan</i>	Taking account of brain development in the teaching of mathematics <i>Marj Horne and Rebecca Seah</i>		Technology, irrational numbers and the Mandelbrot set <i>Daniel Milutinovic</i>	Having some fun with numeracy and maths <i>Dave Tout</i>
Room 12	How's your mathematical diet? - Bringing maths to life through intentional fun <i>Joanna Tutos</i>	<b>FULL</b> Why extend when you can enrich? <i>James Dann and Ashhad Ibrahim</i>		Preparing students for exams <i>Peter Fox</i>	Succeeding with networks in General Mathematics <i>Anthony Davies</i>
Room 13	Reviewing the 2022 Mathematical Methods examinations <i>Allason McNamara and Cathy Devlyn</i>	Discovering maths through tangible experiences: a visual approach. <i>Shelley Pendlebury and Jessica Clark</i>		Supporting Year 7 - 9 students significantly behind in mathematics <i>Eugenie Kestel</i>	Mixed six tasks - a framework for assessment and proficiencies <i>James Mott</i>

# SESSION SUMMARY: THURSDAY (cont.)

THURSDAY 30 NOVEMBER 2023

## SUB-THEMES

Improving assessment, through balancing formative and summative approaches	Exploring evidence for improving student achievement outcomes	Improving positive dispositions for teachers and students, valuing mathematics and its applications	Unpacking high quality teaching, learning, and resources	Focusing on the proficiencies at the heart of mathematics and numeracy learning	Multiple sub-themes
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Room	Session A 11am - 12pm	Session B 12.10pm-1.10pm	LUNCH 1.10pm - 2pm	Session C 2pm-3pm	Session D 3.10pm-4.10pm
Room 14	<b>FULL</b> Pseudocode in Year 7-10 <i>Echo Gu</i>	Geometric constructions <i>Neale Woods</i>		Unit 3/4 Foundation Mathematics - the first year <i>Catherine Bushell</i>	How to effectively use the TI-Nspire to code in Python <i>Steve De Domenico</i>
Room 15	Aiming high: snake makes it to woodstock in a quadcopter! <i>Brian Lannen</i> <i>The presenter has cancelled this session</i>	Understanding asymptotic behaviour of rational functions; dealing with differential equations <i>Greta Gomes and Shubhankar Roy</i>		From tasks to lessons to sequences <i>Peter Sullivan</i>	Aiming high: reaching for the stars with time-lapse photography analysis <i>Brian Lannen</i> <i>The presenter has cancelled this session</i>
Room 16	Effective, painless classroom teaching of secondary school algebra <i>Peter Collins</i>	Implementing pseudocode and algorithms in Python on computer and CAS <i>Enzo Vozzo</i>		Sorting and matching tasks <i>Matt Skoss</i>	<b>FULL</b> Efofex Multidocs - create self modifying mathematics documents! <i>Paul Hooper</i>
Room 17	Using assessment to address breadth of understanding in place value. <i>Emma Moore and Kate Eastcott</i>	Refining questions skills to formatively assess student understanding <i>Robert Kaplinsky</i>		Three engaging methods to uncover and fix hidden student misconceptions <i>Robert Kaplinsky</i>	Investigations - a tale of two calculators <i>Brett Stephenson and Leilani Stephenson</i>
Room 18	Influencing change across and up - middle leadership in action. <i>Bernadette Pearce and Lauren Gould</i>	From market stalls and mock economies to meaningful mathematics <i>Dr Carly Sawatzki</i>		Using a fantasy board game to learn maths <i>Lucas Rocha</i>	<b>FULL</b> Simple, powerful collaborative planning <i>Scott Hamilton and John Grinstead</i>
Room 19	I beg to differ-entiate! <i>Andrew Lorimer-Derham</i>	Developing and consolidating basic number facts with cards <i>David Dunstan</i> <i>Cancelled due to low numbers</i>		From deci-pipes to deci-mats <i>Kris Westcott</i>	Introducing the Maths In Schools project <i>Celia Coffa and John West</i>
Room 20	<b>FULL</b> Building thinking classrooms: Using Liljedahl's strategies for engaging students <i>Kate Copping and Carmel Mesiti</i>	Evidence based spaced practice <i>Anna McGann</i>		The digital assessment library – providing meaningful mathematics assessments <i>Crystal Afitu and Zahara Forte</i>	<b>FULL</b> The do's and don'ts of a differentiated and inclusive classroom <i>Luke D'Astoli</i>
Room 21	Real world interdisciplinary application for learning & assessing in middle years <i>Natasha Muller</i>	<b>FULL</b> Leading mathematics and numeracy improvement: developing your strategy <i>Kerryn Sandford</i>		The benefits of using multiplicative diagnostic assessment for teachers <i>Lei Bao</i> <i>Cancelled due to low numbers</i>	<b>FULL</b> 85% of people misuse statistics! <i>Andrew Lorimer-Derham</i>



# SESSION SUMMARY: THURSDAY (cont.)

THURSDAY 30 NOVEMBER 2023

## SUB-THEMES

Improving assessment, through balancing formative and summative approaches	Exploring evidence for improving student achievement outcomes	Improving positive dispositions for teachers and students, valuing mathematics and its applications	Unpacking high quality teaching, learning, and resources	Focusing on the proficiencies at the heart of mathematics and numeracy learning	Multiple sub-themes
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Room	Session A 11am - 12pm	Session B 12.10pm-1.10pm	LUNCH 1.10pm - 2pm	Session C 2pm-3pm	Session D 3.10pm-4.10pm
Room 22	The Victorian Curriculum Version 2.0 for Mathematics: future-facing opportunities. <i>Michael MacNeill</i>	Weaving numeracy through aboriginal storytelling. <i>Andrea O'Connor and Michael Chisholm</i>		The amazing beginnings of mathematics that we use everyday <i>Calvin Irons and James Burnett</i>	Putting rote learning in its place <i>Joseph Wright</i>
Room 23	Why context is the critical starting point in numeracy (and maths) <i>Dave Tout</i>	Visualising decimal place value to build understanding <i>Antje Leigh-Lancaster</i>		Getting the most from FX draw <i>Paul Hooper</i>	Computational thinking in the Australian curriculum: mathematics <i>Rachael Whitney-Smith</i> <i>The presenter has cancelled this session</i>
Room 24	Racing toy cars in a maths classroom? Why not! <i>John Widmer and Robert Money</i>	From discovery to growth: measuring student learning progress in mathematics <i>Kylie Armstrong, Mitchell Land and Craig Blake</i>		Problem-solving process, prospective math teachers, TI-Nspire-CAS calculator and ChatGPT, exploring tasks <i>Cho Cheong-Soo, Wenting Liu and Ye Ji Park</i>	Long division - would that it was (stikethrough) were so simple <i>Eric Lindberg</i>
Room 25	Real trigonometry using real time real world data <i>Enzo Vozzo</i>	Kicking goals with trigonometry: video-enabled maths in the real world <i>Alastair Lupton</i>		FULL CAS techniques for Mathematical Methods and examination 2 solutions-CAS <i>Sanjeev Meston</i>	Integration by MaffsGuru and Nelson VicMaths <i>Darren Smyth and Robert Yen</i>

# SESSION SUMMARY: FRIDAY

FRIDAY 1 DECEMBER 2023

## SUB-THEMES

Improving assessment, through balancing formative and summative approaches	Exploring evidence for improving student achievement outcomes	Improving positive dispositions for teachers and students, valuing mathematics and its applications	Unpacking high quality teaching, learning, and resources	Focusing on the proficiencies at the heart of mathematics and numeracy learning	Multiple sub-themes
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Room	Keynote 9.15am - 10.15am		Session E 11am - 12pm	Session F 12.10pm-1.10pm		Session G 2pm-3pm	Session H 3.10pm-4.10pm
Room 1	Early mathematical explorations: Connecting numeracy with everyday learning <i>Professor Nicola Yelland</i>	MORNING TEA 10.15am- 10.50am	Going beyond 'share time' <i>Ellen Corovic</i>	FULL Picture books - a springboard for effective maths teaching <i>Sheila Griffin and Di Liddell</i>	LUNCH 1.10pm - 2pm	Putting the plus in planning -collaboratively improving student outcomes <i>Ruth Staniscia and Michelle Perceval</i>	Happy numbers: an enjoyable number investigation! <i>Peter Sanders</i>
Room 2	Curriculum resources as a vehicle for change: Can they make a difference? <i>Nadia Walker</i>		Earliest experiences with division <i>Jill Cheeseman, Ann Downton and Ben Dixon</i>	Introducing Digidial, problem solving handbook and hands-on maths series <i>John West</i>		FULL Empowering mathematical minds: the power of student conferencing <i>Ramya Deepak Kumar, Dearnne Backhouse and Tania Hunter</i>	Introducing the most versatile maths manipulative: the Rekenrek! <i>Amy How</i> <i>The presenter has cancelled this session</i>
Room 3	Aiming high: What does this mean for Indigenous education in mathematics? <i>Professor Chris Matthews</i> <i>Supported by</i> 		Using number talks to build maths proficiency <i>Alex Box</i>	The balancing act of achieving whole school numeracy improvement <i>Amy Somers</i>		Mathematics Academy: embedding enrichment through extra curricular programs <i>Rachael Gore and Andrew Robinson</i>	FULL But where is the explicit teaching in rich tasks? <i>Marissa Cashmore</i>
Room 4	Standing on the shoulders of primary teachers- lessons for a secondary context <i>Michael Minas</i>		Authentically assessing student learning when using challenging tasks <i>Jane Hubbard</i>	Problem solving - how we teach and assess mathematical proficiency <i>Paul Staniscia</i>		Engaging = investigative + effective <i>Sarah Crook and Kelli Simmons</i>	Developing a whole school approach to mental computation <i>Ange Rogers</i>
Room 5	FULL How I blend building thinking classroom and the 5 practices <i>Robert Kaplinsky</i>		How can we build conceptual connections through mathematical language? <i>Donna McNeight</i>	School case study: daily reviews - putting Rosenshine's principles into action <i>Laura Siu, Tim Hughes, Craig Turner and Chelsea Bowman</i> <i>Cancelled due to low numbers</i>		Problem solving- so much more than worded problems <i>Bernadette Long</i> <i>The presenter has cancelled this session</i>	Using assessment to develop a deeper understanding of fractions. <i>Michael Nelson</i>

# SESSION SUMMARY: FRIDAY (cont.)

FRIDAY 1 DECEMBER 2023

## SUB-THEMES

Improving assessment, through balancing formative and summative approaches	Exploring evidence for improving student achievement outcomes	Improving positive dispositions for teachers and students, valuing mathematics and its applications	Unpacking high quality teaching, learning, and resources	Focusing on the proficiencies at the heart of mathematics and numeracy learning	Multiple sub-themes
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Room	Session E 11am - 12pm	Session F 12.10pm-1.10pm	LUNCH 1.10pm - 2pm	Session G 2pm-3pm	Session H 3.10pm-4.10pm
Room 6	Visible thinking routines for building mathematical reasoning <i>Ramya Deepak Kumar, Tania Hunter and Dearnne Backhouse</i>	What exactly is the science of maths? <i>Ange Rogers</i>		<b>FULL</b> The use of rubrics when engaging with challenging mathematical tasks <i>Alison Hall</i>	Fractured fractions and fractious fractals: vocabulary within and beyond mathematics <i>Karen Rogers</i> <i>The presenter has cancelled this session</i>
Room 7	Fostering productive dispositions in mathematics using everyday classroom materials. <i>Bridgeen Pritchard and Kris Westcott</i>	Active recall: how small changes equal big differences in the mathematics classroom <i>Amber Marcus</i> <i>The presenter has cancelled this session</i>		A connectionist approach to data, fractions and students' lives <i>Elise van der Jagt</i>	Teaching fractions in the primary curriculum – what's new! <i>James Burnett and Calvin Irons</i>
Room 8	Launch, explore, summarise- but how? <i>Renee Ladner and Amy Somers</i>	"Greatest of all time": unpacking ABC education GOAT maths games <i>James Russo, Ann Gervasoni, Amy Nelson and Astrid Scott</i>		Multi-sensory maths - effective instruction catering for learning differences <i>Esther White and Nicole Caddaye</i>	Challenging tasks in mathematics: the experience of Brisbane Catholic Education <i>Carly Millichap and Alana Bandholz</i>
Room 9	Using MyNotebook to enhance teaching. <i>Alistair Shaw</i>	<b>FULL</b> Bisection and Newton's method and pseudocode in Maths Methods. <i>Trang Pham</i>		Networks by MaffsGuru and Nelson VicMaths - VCE General <i>Darren Smyth and Robert Yen</i>	Focusing on parabolas <i>Peter Fox</i>
Room 10	<b>FULL</b> Embracing the new study design content with technology - Methods and Specialist <i>Peideng Nie</i>	How's your mathematical diet? - Bringing maths to life through intentional fun <i>Andrew Lorimer-Derham</i>		How can students prove multiplication? <i>Karim Noura</i> <i>Cancelled due to low numbers</i>	Using non-examples to boost students' maths achievement <i>Kathy Lin</i>
Room 11	From maths to code: bridging the gap through computational skills <i>Stephen Alderton</i>	Introduction to Keynesian probability <i>Terence Mills</i>		Using mathematics for random questions <i>Peter Fox</i>	Autograph graphing program revisited <i>Neale Woods</i> <i>Cancelled due to low numbers</i>
Room 12	Mathematics and the modern classrooms project in Victoria <i>Madeleine Anderson and Olivia Hopwood</i>	Extension mathematics for the higher achieving students in our classes <i>Ian Bull</i>		Valuing mathematics through financial literacy: free resources and games <i>Damian Nicholson</i>	Unleashing creativity: integrating math and art with Desmos <i>Nery Soto and Laura McClure</i>
Room 13	Playing with percentages <i>Chris Hurst and Paula McMahon</i>	To CAS or not to CAS ... The (exam) question <i>Alastair Lupton</i>		Perfect numbers, continued fractions, Fermi problems and more <i>Stephen Broderick</i>	Geometry - dot to dot drawings and beyond <i>Robert Money and John Widmer</i> <i>Cancelled due to low numbers</i>



# SESSION SUMMARY: FRIDAY (cont.)

FRIDAY 1 DECEMBER 2023

## SUB-THEMES

Improving assessment, through balancing formative and summative approaches	Exploring evidence for improving student achievement outcomes	Improving positive dispositions for teachers and students, valuing mathematics and its applications	Unpacking high quality teaching, learning, and resources	Focusing on the proficiencies at the heart of mathematics and numeracy learning	Multiple sub-themes
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Room	Session E 11am - 12pm	Session F 12.10pm-1.10pm	LUNCH 1.10pm - 2pm	Session G 2pm-3pm	Session H 3.10pm-4.10pm
Room 14	Worthwhile CAS use in this year's Mathematical Methods Exam 2 <i>Kevin McMenamin</i>	Using functions and tables for learning with a scientific calculator <i>Barry Kissane</i>		Activating mathematical thinking through peer assessment <i>Ursula Parker and Geoffrey Menon</i>	<b>FULL</b> Foundation mathematics: investigations to engage and empower students <i>Marilyn Hand</i>
Room 15	Integrating 'MathTask' as a powerful pedagogical tool in secondary classrooms <i>Jiqing Sun</i>	Practical tips for teaching Pythagoras <i>David Leigh-Lancaster</i>		<b>FULL</b> Developing student capabilities in mathematical methods <i>Zoe Schaffner and Hishaam Ibrahim</i>	<b>FULL</b> The mathematics of artificial intelligence for Years 9-12 <i>Georgia Gouros</i>
Room 16	Exploring mathematics through poetry <i>Tom Petsinis</i>	<b>FULL</b> Bringing a smile to the maths classroom with lesson openers and concrete material <i>Vicky Kennard</i>		<b>FULL</b> Three ways with quadratics <i>David Leigh-Lancaster</i>	<b>FULL</b> Unpacking the construction of an investigation task for Maths Methods <i>Jeremy Elton and Steph Douglas</i>
Room 17	Improving numeracy engagement: a connected curriculum approach <i>Gloria Yi and Milton Bai</i>	Tackling 2-step worded problems using a 'numberless' approach <i>Antje Leigh-Lancaster</i>		Maths on a mat with Matt <i>Matt Skoss</i>	<b>FULL</b> Developing reasoning thinking in middle years <i>Bernadette Mercieca</i>
Room 18	Thinking deeply for success in mathematics <i>Kaye Stacey</i>	Learner agency and assessment <i>Larissa Raymond</i>		Putting education evidence to work in maths teaching <i>Michael Rosenbrock</i>	Supporting students to own their thinking when overcoming productive struggle <i>Susan Graham and Leah Gates</i>
Room 19	Maths at home and school? <i>Douglas Williams</i>	Out of field maths teachers. Realising the potential <i>Leanne McMahon</i>		The Maths Metro: stronger conceptual connections <i>David Innes</i>	<b>FULL</b> Moving in maths - planning for an active and engaging learning environment <i>Mark Wilson</i>
Room 20	The hidden power of estimation <i>Michaela Epstein</i>	Teaching for understanding with the Mathomat geometry template <i>John Lawton</i>		Engaging ways to promote geometric thinking in the primary years <i>Jessica Kurzman and Liz Stoward</i>	Empowering student growth: rubric driven assessment, data, and differentiation <i>Lianna Beeching</i>
Room 21	Exploring place value and the metric system with meaningful resources <i>Genovieve Grouios</i> <i>Cancelled due to low numbers</i>	Teaching angle and developing spatial reasoning <i>Rebecca Seah and Marj Horne</i>		Creating opportunities for student self-reflection in the maths classroom <i>Melissa Wood, Sarah Brooks and Amanda Black</i>	The Victorian Coding Challenge supporting coding/programming/STEM in schools <i>Danijela Draskovic and Max Stephens</i>

# SESSION SUMMARY: FRIDAY (cont.)

FRIDAY 1 DECEMBER 2023

## SUB-THEMES

Improving assessment, through balancing formative and summative approaches	Exploring evidence for improving student achievement outcomes	Improving positive dispositions for teachers and students, valuing mathematics and its applications	Unpacking high quality teaching, learning, and resources	Focusing on the proficiencies at the heart of mathematics and numeracy learning	Multiple sub-themes
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Room 22	I beg to differ-entiate! <i>Joseph Wright</i>	What's important? Multiplicative thinking, that's what! <i>Chris Hurst and Paula McMahon</i>		Simple tools for deep thinking <i>Michaela Epstein</i>	Wolfram language and Mathematica software for all. <i>Ian Willson</i>
Room 23	<b>FULL</b> The Victorian Curriculum version 2.0 : For mathematics: future-facing opportunities <i>Michael MacNeill</i>	Mathematics fun-damentals for middle-school <i>Nadia Abdelal</i>		Proficiency and mathematical modelling in the Australian Curriculum: Mathematics <i>Rachael Whitney-Smith</i> <i>The presenter has cancelled this session</i>	General Mathematics exams: using the CAS calculator efficiently and effectively <i>Kevin McMenamin</i>
Room 24	<b>FULL</b> Dyscalculia - understanding is crucial for effective intervention! <i>Catherine Epstein/Rodgers and Isabella Kottek</i>	Research into productive pedagogical relationships - enhancing your relationships with students <i>Thomas Moore</i>		You need a task library <i>Douglas Williams</i>	Ideas for teaching logic and proof in Specialist Mathematics <i>Peter Flynn</i>
Room 25	A question of sport - statistical and functional modelling <i>Peter Flynn and Kara Fox</i>	Teaching 'fractions' using representations appropriate to student level of understanding <i>Heather McMaster</i>		Número - perfect for basic facts, problem solving, reasoning, fluency! <i>Julie Richards</i>	Mathematical intuitive thinking ability in high school <i>Sydney Tao</i>

# SESSION DETAILS

## THURSDAY 30 NOVEMBER 2023

## KEYNOTES: Thursday, 9.15am-10.15am

### KT01 TEACHING AND LEARNING SPATIAL REASONING IN THE EARLY PRIMARY YEARS.

**Dr Tracy Logan, University of Canberra**  
(F to Year 3)

As educators, we want all students to be successful in mathematics. However, what if success didn't look like what we traditionally considered as mathematics? One such area to consider is spatial reasoning—the capacity to generate and manipulate objects in both two and three dimensions in your mind's eye. Research indicates a strong, ongoing relationship between people who have high spatial reasoning and success in mathematics. Research also indicates that spatial reasoning can be improved through instruction. This presentation will describe what spatial reasoning is, unpack some of the research around spatial reasoning and mathematics, and discuss the implications for teaching and learning in classrooms.

### KT02 AIMING HIGH BY LEADING WELL: STRATEGIES FOR SCHOOL MATHEMATICS LEADERSHIP THAT CHALLENGES MATHEMATICS LEARNING

**Matt Sexton, ACU**  
(Year 1 to Year 6)

Research is bound full of stories about the importance of school leadership that supports students to learn well and teachers to teach effectively. That research, however, has tended to focus on the role of the principal.

With its recent attention, mathematics education research sees the importance of the school mathematics leader in leading improvement in mathematics education in primary school settings. The school mathematics leader plays an important role in designing and leading improvement through professional learning leadership.

In this keynote presentation, Matt will draw on research and “stories of practice” that demonstrate how mathematics leaders have led teachers to shift their teaching that offers challenge in mathematics lessons through school-based professional learning. Matt will highlight the leadership actions within those stories to showcase how school mathematics leaders created conditions for learning that supported teachers and students to aim high.

This presentation will appeal to primary school mathematics leaders, numeracy coordinators, or learning leaders responsible for mathematics education.

### KT03 ACCELERATION: TRANSPOSING BREADTH FOR TIME AT THE EXPENSE OF UNDERSTANDING

**Peter Fox, Texas Instruments Australia P/L and Danijela Draskovic, The Mathematical Association of Victoria**  
(Year 7 to Year 12)

Accelerated, Advanced, High Achievers or SEAL, call it what you like, it may be doing more harm than good, particularly in a post pandemic environment. Selection criteria include aptitude tests, teacher recommendations, and exam scores. Bludgeoning accelerated programs serves no purpose unless an alternative is offered, a Middle School Mathematics Elective. Accelerated mathematics program focus on streaming and progressing students through the curriculum at a faster pace. An elective aims to increase breadth, depth and engagement. Will students really choose to study more mathematics when other offerings include titles such as: Stick-Ball Games or Cake Decorating? The answer to this question may surprise and the results amaze.

Moving past the research, data and experiences, participants in this presentation will engage in sample problems and be provided with sample units of work.

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## KEYNOTES: Thursday, 9.15am-10.15am (cont.)

### FULL KT04 SELF-REGULATED LEARNING: SCAFFOLDING INCREASING LEARNER INDEPENDENCE FOR HIGHER ACHIEVEMENT

**Oliver Lovell, Brighton Grammar School  
(Year 7 to Year 12)**

One of the key differences separating more and less successful mathematics students is the extent to which they take charge of their own learning. More successful students are able to set learning goals, seek resources and support to help them learn the required content, monitor their learning as they go, then reflect on their progress and change tack as needed. But how can we help more students be more self-regulated in their learning? In this keynote, Ollie Lovell will share a collection of novel approaches to scaffolding learner independence that originate from the self-regulated learning literature as well as his current PhD research in this area.

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the sorts of innovative finance-related programs and lessons that students need. And with the right support, they can do it!

In this keynote address, Carly will explain why the discipline of mathematics, and mathematics teachers and teaching are so important. She will also explore recent F-12 curriculum developments, what these changes promise students, and what you can do to better connect young people's real and mathematical worlds.

This session will appeal to school leaders and Foundation - Year 12 teachers.

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### KT05 STUDENTS WANT TO LEARN ABOUT FINANCE IN MATHEMATICS. SO, WHAT CAN WE DO DIFFERENTLY?

**Dr Carly Sawatzki, Deakin University  
(F - Year 12)**

Regardless of their age, school students are learning about money within their families, friendships, and online (including via media and social media). Before they hit your classroom each day, most have experienced financial exchange of some sort, usually involving technology.

While students' financial activities and interests offer rich contexts for mathematisation, mathematics teachers often struggle to know what and how to teach about money. A lack of knowledge and confidence in this area can mean that financial education at school is limited to budgets and best buys. Educational researchers argue that we are out of touch and failing to prepare young people for the sorts of problems and risks modern financial life is throwing up.

Dr Carly Sawatzki has been researching financial education in schools in Australia and New Zealand for more than a decade. She recently led a Deakin University study that showed that teachers want to work in interdisciplinary teams to develop

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# SESSION A: Thursday, 11am-12pm

## A01 IMPLEMENTING SPATIAL REASONING INTO YOUR CLASSROOM

**Dr Tracy Logan, University of Canberra**  
(F to Year 2)

Spatial reasoning has shown to be closely related to mathematical thinking. This session will demonstrate the different areas of spatial reasoning and ways you can implement this type of thinking into your own classroom without adding to the amount of content that you have to teach. During the session we will explore spatial reasoning through the Experience, Language, Pictorial representations, Symbolic representations, and Application (ELPSA) pedagogical framework and the Visualise-Predict-Check (VPC) student heuristic.

## A02 PLANNING FOR TEACHING WITH TASKS AND RECOGNISING POLYGONS

**The presenter has cancelled this session**

(Unpacking high quality teaching, learning, and resources)

**Sharyn Livy, Monash University**  
(F to Year 3)

In this session, you will learn valuable techniques to enhance your planning process, when incorporating tasks that encourage geometric reasoning and problem-solving skills. We will discuss the importance of anticipating student responses and approaches for planning purposeful questions to extend students' mathematical thinking. To provide practical examples, we will share lesson ideas centred around classifying, making, naming, and describing two-dimensional polygons. By the end of this workshop, you will have the tools and knowledge to effectively plan for teaching with challenging tasks and a deeper understanding of approaches for teaching geometry in the early years.

## A03 IS THIS STILL 3? A STORY OF SUBITISING IN FOUNDATION

(Unpacking high quality teaching, learning, and resources)

**Georgia Dimitrovski and Erika Starcic, Deer Park North Primary School**  
(F to Year 2)

How could 10 flies on the wall possibly teach students about subitising? Subitising is not just the use of dot flash cards! Subitising is about thinking, seeing, partitioning and 'just knowing'. Come and join the Deer Park North Primary School Foundation teachers to explore how our students learnt to subitise, justify and record their thinking. Learn how playing games, creating 'struggle time' sessions and peer to peer observations allowed our students to become proficient in subitising. Feel the buzz as we take you on our students' journey through our structure of number unit. We will be sharing our takeaways, while you are actively exploring challenging tasks suitable for Foundation students. Become a Foundation student for this session as you join Georgia and Erika sharing their journey with the 10 flies on the wall.

**Key takeaways:**

1. Activities that you can take into your own classroom and implement easily.
2. A new way to think about teaching subitising to Foundation students.
3. Creating a culture of 'struggle time' for each student to be able to access the problem at their level.

## A04 STUDENT GOALS BASED ON THE MATHEMATICS ONLINE INTERVIEW (MOI)

(Improving assessment, through balancing formative and summative approaches)

**Hannah Marino, St John XXIII Primary School**  
(F to Year 4)

Given there is a wide variety of assessments used in mathematics it can be challenging for leaders and teachers to know how to utilise assessments in order to address the needs of the class as well as the individual needs of students. This presentation will take you through the process of how St John XXIII primary school have utilised the 'counting' component of the mathematics assessment interview (MOI) to formulate counting goals for individual students. This workshop will cover the implementation of the goals and how these compliment a problem solving approach to the teaching and learning of mathematics.

**Key takeaways:**

1. Utilising data.
2. Building autonomy in students.
3. Variation in lesson structure.

## A05 THESE ARE A FEW OF MY FAVOURITE THINGS

**Nadia Walker, NSW Department of Education**  
(Year 1 to Year 6)

Choosing the right tasks is so important when designing engaging and appropriately challenging learning experiences. In this hands-on workshop we'll explore some of my favourite mathematical tasks including a range of daily number sense ideas and learning tasks to make students think, reason, problem solve and build their mathematical understanding.

## FULL A06 STRATEGIES TO ENHANCE SUCCESSFUL PROBLEM SOLVING

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

**Catherine Epstein/Rodgers, Numeracy Leader St Peter's East Bentleigh and St Paul's Bentleigh and Antje Leigh-Lancaster, Leigh-Lancaster Consulting**  
(Year 3 to Year 6)

Challenging problems provide students with the opportunity for productive struggle, and teachers with the opportunity for differentiated instruction using enabling and extending prompts.

In this workshop, you will explore and apply Polya's four principles of problem-solving: understand the problem, devise a plan, carry out the plan, look back (and reflect) to a collection of interesting and challenging problems suitable for Levels 3 - 6.

This will include discussion of approaches and strategies aimed at enhancing student success in mathematical problem-solving, such as:

- classroom organisation
- probing questions to check for understanding and to support differentiation
- developing and using numberless word problems

This will be a practical, hands-on workshop, where you'll have the opportunity to experience and apply the approaches discussed.

**Key takeaways:**

1. Strategies to help students successfully approach problem solving.
2. A collection of rich and challenging tasks.

3. Ideas for creating a whole school approach to problem solving.

Remember: Participants will need a pen and paper and be keen to have a go.

## FULL A07 FIRST 10 DAYS OF MATHS: ESTABLISHING A CONSISTENT LEARNING CULTURE

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Christian Terlich and Steve Lester, Leongatha Primary School**  
(F to Year 6)

Does your school have some great mathematical practices happening in isolation? Is your school looking at establishing a consistent approach to teaching and learning to ensure all students have the opportunity to be successful while building teacher confidence? This workshop will share the case study of a school that has used the 'First 10 Day of Maths' to help shift their teaching and learning culture. Some concepts that will be shared include the mathematical proficiencies, effective learning partners, Number Talks, using manipulatives, open-ended learning tasks and a consistent instructional model.

**Key takeaways:**

1. Whole school instructional model.
2. Hands on learning tasks.
3. First 10 days of maths resources.

## A08 INQUIRY BASED PEDAGOGIES: WHERE TO FROM HERE? A COLLABORATIVE DISCUSSION.

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

**James Russo, Jane Hubbard and Jessica Kurzman, Monash University**  
(F to Year 8)

The issues, benefits and practicalities of using inquiry-based pedagogies in mathematics are central to many education discussions for all stakeholders including classroom teachers; school leaders; system leaders and policy developers.



## SESSION A: Thursday, 11am-12pm (cont.)

Recognising there is no 'one size fits all' solution to this ongoing issue, James, Jane and Jess open the discussion on some of the main challenges mathematics educators will encounter in this space over the next few years. This workshop will invite the participants to contribute to this robust discussion by way of hearing the perspectives from schools, system and tertiary contexts as well as offering their own insights and experiences about teaching mathematics through inquiry based approaches.

### Key takeaways:

1. Teachers sharing practice, connecting teachers with research.

Remember: This is an interactive, discussion based workshop where participants are encouraged to share their stories and work in groups to discuss the issues presented.

### FULL A09 CODING / PSEUDO-CODING FOR ALGORITHMIC THINKING, COMPUTATIONAL MATHEMATICS AND STEM

(Unpacking high quality teaching, learning, and resources)

**Sanjeev Meston, Firkbank Grammar School  
(Year 7 to Year 12)**

The advancements in the world of STEM, Artificial Intelligence and Data Science are driven by Algorithmic thinking and Computational Mathematics. The Australian and Victorian curriculum and VCE Mathematics study design now lays a greater emphasis on Computational Mathematics, Algorithmic thinking and Pseudo-coding.

This session will aim to equip Mathematics teachers with the skills to understand and process Mathematics learning with

- algorithm thinking
- writing a pseudocode
- implementing the pseudo-code in Python
- running the code (executing the code) as a program

Following this session, teachers will be better equipped to teach computational mathematics as part of the mathematics curriculum. Also, they will be able to teach students to develop skills for building mathematical models, numerical methods, and algorithms for solving complex problems in science, engineering, business, and other fields using computers.

### Key takeaways:

1. Develop skills for algorithmic thinking and Pseudo-coding.
2. Move into the world of coding / programming.
3. Add value to mathematics learning and make it engaging, purposeful and productive.

Remember: For participants to engage actively, we will use the Python version (module) on TI-Nspire CX-II teacher software of TI-Nspire CX-II Handheld. All participants must ensure that they are on version 6 of the software.

### FULL A10 USING CAS CALCULATOR EFFECTIVELY AND EFFICIENTLY IN VCE SPECIALIST MATHS.

(Unpacking high quality teaching, learning, and resources)

**Trang Pham, Methodist Ladies' College  
(Year 11 to Year 12)**

This workshop addresses not only the value and the power which CAS may add to a mathematics classroom but also draws attention to the time, effort and resources, involved in learning and utilising the device in most effective and efficient way possible. Using the CAS calculator effectively and efficiently would vastly benefit the students, particularly in the multiple-choice questions section of Examination 2. Students would be more enthusiastic and interested in using CAS as it makes them feel confident and advantaged in the assessments. This workshop will explore how CAS calculators (both TI-Nspire CAS and ClassPad) can be used to solve some past multiple-choice questions from the VCAA Examination 2.

### Key takeaways:

1. Making the concepts more interesting and easier to teach.
2. Improving the students' perception of mathematics.
3. Increasing students' enjoyment of the subject and their motivation to learn.

Remember: Bring your own CAS calculator handheld or emulator (either TI-Nspire CAS or Casio ClassPad) to this workshop.

### FULL A11 EVEN MORE PUZZLES, PROBLEMS AND TRICKS OF THE TRADE

(Unpacking high quality teaching, learning, and resources)

**Mike Ristovsky and Taylor Pervan, Christ Church Grammar School, WA  
(Year 7 to Year 10)**

While captivating children in the mathematics classroom can be challenging, employing thoughtfully crafted activities can ignite discussions about the pleasures of mathematics, granting teachers a unique window into student thinking.

This session will delve into 8 puzzles and problems that I have amassed throughout my three decades of instructing secondary students in various classroom environments.

These particular activities have been carefully selected because they empower students to explore mathematics, make decisions, and uncover new insights, with the teacher assuming the role of a facilitator rather than a mere instructor.

Participants will be smoothly guided through the activities at a comfortable pace that accommodates everyone. Additionally, handouts will be provided so that the material can be readily applied in Monday morning classes. I encourage you to bring a calculator, if available, and approach the session with a curious mindset.

### Key takeaways:

1. A resource pack of Puzzles and Problems (with solutions) that can be used to encourage mathematical thinking in the classroom that is not always evident in standard text books.

### A12 HOW'S YOUR MATHEMATICAL DIET? - BRINGING MATHS TO LIFE THROUGH INTENTIONAL FUN

Commercial presentation

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

**Joanna Tutos, The Educational Advantage Pty Ltd  
(Year 7 to Year 8)**

The healthy food pyramid we grew up with (carbs in the 'eat most' section) has changed dramatically, yet our mathematical diets remain the same. High in fluency, low in engagement.

To thrive in the age of AI, our students need a more balanced mathematical diet. One that enables them to apply their skills in novel ways, think creatively and solve interesting problems.

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- Novel challenges infused with joy.

Come and see why over 2000 food critics (students) most commonly describe their experience as 'fun, challenging, interesting and exciting'. Bookings essential.

This experience will be offered on the alternate day by Andrew Lorimer-Derham.

### Key takeaways:

1. What Maths Mate textbooks are bringing maths to life through intentional fun.
2. Why to thrive in the age of Artificial Intelligence, students need to be equipped to solve novel problems and to think creatively.
3. How adding hundreds of starters, rich activities, games and puzzles to the more traditional textbook structure.

Remember: Bring your mathematical appetite and join our presentation to sample this diet and enjoy dishes you have never tasted before.

### A13 REVIEWING THE 2022 MATHEMATICAL METHODS EXAMINATIONS

Exploring evidence for improving student achievement outcomes

**Allason McNamara, Trinity Grammar School and Cathy Devlyn, Fintona Girls' School  
(Year 11 to Year 12)**

Allason and Cathy will do a similar session to the 2023 MAV Meet the Examiners Lecture for Mathematical Methods. They will discuss common errors that students made on the 2022 examinations. Cathy will talk about Exam 1 and Allason Exam 2. The statistics for each question will also be shown.

### Key takeaways:

1. Teachers will be aware of the common mistakes students



## SESSION A: Thursday, 11am-12pm (cont.)

make in Mathematical Methods examinations.

2. The session will help teachers to plan their 2024 classes for effective student learning.

Remember: 2022 examination papers.

### FULL A14 PSEUDOCODE IN YEAR 7-10

(Unpacking high quality teaching, learning, and resources)

**Echo Gu, Lauriston Girls' School  
(Year 7 to Year 10)**

This session showcases some activities that can be used in Year 7 to 10 Maths classroom for teaching pseudocode. These tasks aim to enhance students' algorithmic thinking ability and provide easy access points in learning pseudocode. The iterative nature of loops facilitate the understanding of recursive relations. The use of function in coding builds a foundation for learning functions in future studies. Python code for some tasks will be demonstrated in an interactive manner.

#### Key takeaways:

1. Activities for teaching pseudocode and accompanying Python code.
2. Early introduction to the idea of function using coding.
3. Build understanding for recursive relations using loops.

Remember: No prior experience in coding required.

### A15 AIMING HIGH: SNAKE MAKES IT TO WOODSTOCK IN A QUADCOPTER!

**The presenter has cancelled this session**

Commercial presentation

(Unpacking high quality teaching, learning, and resources, Exploring evidence for improving student achievement outcomes, Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Brian Lannen, Murray Mathematics Curriculum Services  
(Year 7 to Year 12)**

In our workshop, Woodstock is a field of colourful flowers mapped out by a Logo Turtle and the quadcopter is an

education edition Tello-drone. These are both directed by code from the Python application in TI-Nspire. No previous coding experience is necessary, though your TI-Nspire will need the 6.0 or greater Operating System. Activities are suitable for any students Year 7 onward who are happy to accidentally develop their computational thinking skills while having fun!

#### Key takeaways:

1. Hands-on activities for Computational Thinking.

Remember: TI-Nspire with 6.0 or greater Operating System.

### A16 EFFECTIVE, PAINLESS CLASSROOM TEACHING OF SECONDARY SCHOOL ALGEBRA

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

**Peter Collins, Dandenong High School  
(Year 7 to Year 10)**

Algebra is seen as a difficult and stressful topic by too many students and too many staff. This should not be the case. It should be seen as a time saving, and maths knowledge facilitating, set of interrelated skills, grounded in reality; NOT a list of increasingly abstract unconnected dot points.

In this session, the presenter will outline a pedagogy and related strategies for teaching algebra. It is one that he has used when either introducing algebra to students unfamiliar with the skill, or reintroducing it to students who have seen it before but "don't get it", or shown to staff panicking about what they are supposed to do.

This session is aimed at maths teachers who are not confident with the teaching of algebra. This may mean inexperienced teachers, or teachers teaching outside their method, or teachers after new ideas.

#### Key takeaways:

1. Be introduced to a method for introducing and teaching algebra; that is coherent, grounded in concrete mathematics, and interconnected.
2. See how algebra is a relevant, useful and logical key to mathematics.

Remember: Before attending, it will be useful to reflect on your concerns re the teaching of algebra, and what makes for a successful learning sequence.

### A17 USING ASSESSMENT TO ADDRESS BREADTH OF UNDERSTANDING IN PLACE VALUE.

(Improving assessment, through balancing formative and summative approaches)

**Emma Moore, The Academy of Teaching and Learning  
Kate Eastcott, Cowes Primary School  
(F to Year 8)**

We will be sharing our experience of using a whole school assessment of place value to identify students' developmental stages. Then we will share a low floor – high ceiling task to teach a differentiated lesson that accommodates this breadth of understanding. Within the lesson, we will share suitable formative assessment ideas to inform planning of subsequent lessons and/or student achievement. We will also share how to use this data to guide explicit point of need teaching throughout the task.

#### Key takeaways:

1. Using a whole school place value assessment and understanding place value stages of development.
2. Using a 'low floor - high ceiling' task to manage differentiation.
3. Embedding formative assessment strategies.

### A18 INFLUENCING CHANGE ACROSS AND UP - MIDDLE LEADERSHIP IN ACTION.

(Exploring evidence for improving student achievement outcomes)

**Bernadette Pearce and Lauren Gould, Catholic Education Sandhurst Ltd  
(F to Year 10)**

The Sandhurst Numeracy Leaders Network (SNLN) vision is to connect and inspire ALL learners to engage in evidence based effective learning and teaching of numeracy which reflects 21C skills; critical thinking and problem solving, creativity and innovation, collaboration and communication.

SNLN is a vehicle for Numeracy Leaders across Catholic Education Sandhurst to provide a spotlight on the unique positioning of Middle Leadership. This session highlights how Middle Leadership can positively impact student achievement in schools. Gain an understanding of how our Numeracy Network provides opportunities for numeracy

leaders and classroom teachers to develop their own leadership toolbox. It assists leaders to recognise who their learners are and, in turn, how to influence change across and up in their school.

#### Key takeaways:

1. Build knowledge of levels of influence, across and up; the unique positioning of a Middle Leader.
2. Develop middle leader toolbox through structured network opportunities.
3. Recognising who your learners are & the potential influence you have.

### A19 I BEG TO DIFFER-ENTIATE!

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Andrew Lorimer-Derham, Think Square  
(Year 3 to Year 10)**

Differentiation is often confused with individualised work or using an online program to deliver content at the appropriate year level. While a step in the right direction, neither of these approaches captures the essence of differentiation.

At its core, differentiation is about providing activities that are rich enough to be engaged with at multiple levels. Tasks and questions that inspire and challenge a wide range of learners.

This hands-on presentation will showcase a range of low-floor high-ceiling activities designed to build mathematical skill, promote collaboration and allow students to engage at their own level of ability.

Participants will come away from this session with some great ideas you can immediately implement in your own classroom.

*This workshop will be offered on the alternate day by Joe Wright*

#### Key takeaways:

1. We often confuse individualised content with differentiation.
2. Differentiation is about providing rich tasks that inspire, engage and challenge a wide range of learners.
3. Participants will come away with a range of low-floor, high-ceiling activities that allow students to engage at their own level of ability.

## SESSION A: Thursday, 11am-12pm (cont.)

### FULL A20 BUILDING THINKING CLASSROOMS: USING LILJEDAHLS STRATEGIES FOR ENGAGING STUDENTS

(Unpacking high quality teaching, learning, and resources)

**Kate Copping and Carmel Mesiti, The University of Melbourne  
(F to Year 10)**

Building thinking in maths classrooms can be challenging but rewarding. Supporting teachers to use research based pedagogical strategies can build engagement in mathematics. In this session, we will be exploring Liljedahl's suite of strategies for building thinking classrooms and sharing our experiences of trialling them with our students.

#### Key takeaways:

1. The use of good tasks.
2. Strategies to engage students.
3. Classroom organisation strategies.

### A21 REAL WORLD INTERDISCIPLINARY APPLICATION FOR LEARNING & ASSESSING IN MIDDLE YEARS

(Unpacking high quality teaching, learning, and resources, Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Natasha Muller, Beaconhills College  
(Year 5 to Year 8)**

In this session you will learn how to engage your learners in mathematical content by planning contextualised project-based learning experiences. We will unpack examples of real world application tasks which are written from an interdisciplinary lens. We will discuss the benefits of project based class tasks and how they can be used as a form of formative and summative assessment to maximise planning & minimise marking. We will also explore marking without 'grades' and how proficiency scales can lead to personalised differentiated learning experiences for each learner.

#### Key takeaways:

1. To plan mathematic real world contextualised project-based tasks.
2. To use real world application tasks for both class lessons

and various forms of assessment.

3. To teach to the point of need allowing for student paced learning.

Remember: This session will require a lot of discussion and possibly note taking.

### A22 THE VICTORIAN CURRICULUM VERSION 2.0 FOR MATHEMATICS: FUTURE-FACING OPPORTUNITIES.

(Unpacking high quality teaching, learning, and resources)

**Michael MacNeill, Victorian Curriculum and Assessment Authority  
(F to Year 10)**

Michael will discuss the new opportunities presented by the Victorian Curriculum Version 2.0 for Mathematics.

#### Key takeaways:

1. An understanding of the changes and benefits of the new structure.
2. An understanding of how the proficiencies are more accessible and how that facilitates learning.
3. An understanding of how the new curriculum creates a clear line of sight in Mathematics education Victorian students, from birth through to senior secondary completion.

### A23 WHY CONTEXT IS THE CRITICAL STARTING POINT IN NUMERACY (& MATHS)

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Dave Tout, Australian Council for Education Research (ACER) and Multifangled  
(Year 5 to Year 12)**

Real-world contexts are critical for engaging learners and providing the purpose for learning about how to use and apply maths in the real world. Starting with the real-world in teaching maths and numeracy provides numerous benefits in enhancing our learner's successful learning and understanding of numeracy and maths skills and can help overcome our learner's anxiety to the world of mathematics. This session will look at why and how this works in practice, both in your

planning and in your teaching. It will use examples such as shopping, food and sport to illustrate how this can work.

#### Key takeaways:

1. Rationale for why context is important in teaching numeracy/maths.
2. Examples of activities on how this can work in practice.
3. Connections between context and curriculum.

### A24 RACING TOY CARS IN A MATHS CLASSROOM? WHY NOT!

(Unpacking high quality teaching, learning, and resources)

**John Widmer and Robert Money  
(Year 7 to Year 10)**

The COVID pandemic has highlighted the value of data. The analysis of big data, small data and real data is an intrinsic part of Maths classrooms. Using custom built toys, teachers can carry entertaining devices into the room and engage students in the collection and analysis of movement data. Speed and acceleration are fundamental concepts in a physics classroom, but the presenters will show that students in a mathematical environment can investigate patterns and create mathematical models from such things as toy cars. All workshop material is located at <http://mag-net.org.au/mavcon>.

#### Key takeaways:

1. Real data collection using an inexpensive motion detector.
2. Mathematical modelling of motion and critique of the model against the data.
3. Student engagement through involvement in the whole process of prediction observation and evaluation.

Remember: Bring your mobile phone.

### A25 REAL TRIGONOMETRY USING REAL TIME REAL WORLD DATA

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Enzo Vozzo, Mentone Grammar  
(Year 9 to Year 12)**

The app Flightradar24, a popular plane tracking app, gives users access to a flight's real time data such as speed, altitude, track, latitude and longitude. Using plane and spherical trigonometry, this real-time, real-world data can be used to calculate and confirm that the speed and track of a flight are correct using four different methods. Three methods involve plane trigonometry and these will depend on particular aspects of a flight: Method 1 deals with flights that are travelling due north or south, Method 2 deals with flights that are travelling due east or west, Method 3 deals with flights near the equator travelling in any direction. Method 4 uses spherical trigonometry and is the method that is actually used by flights. The theory behind each method will be discussed along with worked examples. All these calculations can be done on a CAS calculator or on a spreadsheet.

#### Key takeaways:

1. A practical application of the use of trigonometry.
2. Application of mathematics to STEM career, i.e. for pilots.
3. The use a spreadsheet and or CAS calculator to perform trigonometric calculations.

Remember: Delegates should download the app Flightradar24 on their mobile phone prior to the session.

## SESSION B: Thursday, 12.10pm-1.10pm

### FULL B01 F-2: BUILDING STRONG PLACE VALUE UNDERSTANDING

(Unpacking high quality teaching, learning, and resources)

Elizabeth Irwin, HILL (High Impact Leading and Learning) Group Consultancy

(F to Year 2)

Developing deep place value understanding of the base ten number system is a core goal for every student. The most effective pedagogy to achieve this goal includes knowing and examining the progression of learning for place value concepts, using the most aligned and appropriate resources to support place value learning, and developing rich Math discourse to help students deepen their understanding of this critical concept.

This workshop will offer participants practical “hands-on” activities and resources to examine the development of place value from F-2 that promotes productive dispositions and a curiosity and passion for thinking mathematically.

#### Key takeaways:

1. Build and refine deeper understanding of the learning progression of place value concepts in the Australian curriculum.
2. Build and refine deeper understanding of the sequence of appropriate place value materials.
3. Apply knowledge to classroom games and experiences that build surface, deep and transfer learning of the place value concept.

### B02 THE CRITICAL IMPORTANCE OF CONSOLIDATING LEARNING

(Unpacking high quality teaching, learning, and resources)

Peter Sullivan, Monash University  
(F to Year 3)

This session will describe a collaborative project that explored ways of engaging students in activating their mathematical thinking. We found that students, from the earliest ages, welcome problem-solving challenges. We also found that it is critical to consolidate learning activated by this problem solving. This session will offer some examples of early mathematics learning sequences and will elaborate how

learning can be effectively consolidated. The ways this applies to other levels, including secondary, will be demonstrated.

### B03 DEVELOPING A WHOLE SCHOOL APPROACH TO MENTAL COMPUTATION

(Exploring evidence for improving student achievement outcomes)

Ange Rogers, Simply Maths Professional Development  
(F to Year 6)

Up to 80% of the calculations adults complete require mental rather than written computation (Reys et al., 2009). The importance of helping students to develop these skills in primary school is clear. This session explores the logistics of developing a whole school approach to the teaching and learning of mental computation. Practical examples will be shared to suggest ways these skills can become embedded in classroom practice. We will share the research-informed, systematic and targeted way we approach the teaching and learning of mental computation. You will walk away from this session with games, insights and ideas to take the first steps towards implementing a whole school approach in your own context.

#### Key takeaways:

1. The importance of developing mental computation skills.
2. The importance of a whole school approach to mental computation.
3. Practical tips for running embedding mental computation in your school.

### B04 INQUIRY CYCLES – A SESSION DESIGNED FOR PRIMARY PLC LEADERS & TEACHERS

(Unpacking high quality teaching, learning, and resources)

Russell McCartney, Leongatha Primary School  
(Year 3 to Year 6)

In this session we will unpack a (four to six week) inquiry cycle, understanding how you, as a PLC leader/teacher, can lead purposeful, data informed sessions with your team. We will then explore how to use the data to improve student outcomes. You will leave this session with a toolkit which helps you tailor this cycle to your school or team. Intended audience primary school teachers.

#### Key takeaways:

1. Packed full of quality tasks you can easily use in your classroom the very next day!

### B05 A FURTHER INVESTIGATION TO INTRODUCING THE EQUAL SIGN IN CHINA

Cancelled due to low numbers

(Unpacking high quality teaching, learning, and resources)

Jiqing Sun, Deakin University and Echo Gu, Lauriston Girls' School  
(F to Year 4)

Fostering students' bidirectional conception of the equal sign (viewing the equal sign as indicating an equivalence of two sides rather than a 'show result' symbol) is challenging, and students' misconception of the equal sign is persistent. Some studies mention that in China, the pedagogical approach to introducing the equal sign supports students' development of bidirectional sense toward the equal sign. Built upon this body of literature, this presentation further unpacks the Chinese pedagogy to teach the conception of the equal sign.

#### Key takeaways:

1. Providing teachers with pedagogical supports in developing students' conception of the equal sign and the big idea equivalence, which is also highlighted in Australian Curriculum 9.0 (e.g. AC9M4A01)

### B06 EIGHT WAYS TO (MATHS) PLAY

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Alex Box, Maths Play  
(F to Year 6)

If we do, indeed, learn through play, then there must be more to 'play' than we've been led to believe. Maths Play is a community research project exploring what it can look like, sound like and feel like to engage positively with mathematics. This session focuses on how better understanding what it means to 'play' allows maths to be reunited with play. Attendees will leave these session with a menu of playful maths activities and lesson ideas to implement immediately, and in the new school year.

#### Key takeaways:

1. What it means to play.
2. Playful mathematics examples.
3. Playful activities and lessons to implement.

### B07 LET'S RUN WITH IT: CONTINUOUS MATHS CONTENT LEARNING

(Unpacking high quality teaching, learning, and resources)

Stacey Lamb, St. Bernard's Primary School Wangaratta  
(F to Year 6)

Continuing the learning of Mathematics content throughout the year can be a challenge! Through the use of warm ups, maths games and maths talks learn how students accessed prior learning and continue learning throughout the year. This workshop will offer maths games and maths talks as well as provide planning ideas and lesson structures that honour continual improvement in mathematics, repeated learning opportunities, problem solving, reasoning and fluency.

#### Key takeaways:

1. Learn about the impact of warm up, maths games and maths talks.
2. How the start of the lesson can be used to continue the learning of mathematical topics.
3. Developing fluency and reasoning through warm up, maths games and maths talks.

### B08 LETTING GO' OF TRADITIONAL VIEWS OF TEACHING MATHEMATICS

(Unpacking high quality teaching, learning, and resources)

Sally Jones and Charelle Zammitt, St Albans North Primary School  
(F to Year 6)

In this session Sally and Charelle will share their experiences with the problem-solving approach to mathematics, looking specifically at a sequence of learning for addition and subtraction. One of their big findings was 'letting go' of traditional views of teaching mathematics and allowing students to become 'inquisitive' learners. They will explore the benefit of asking open-ended questions to support students in thinking deeper about the learning process and using reflection time effectively. This will be a hands-on session where participants will be invited in to engage in learning tasks, be provided with resources and shown worked examples of student data and success.



## SESSION B: Thursday, 12.10pm-1.10pm (cont.)

### Key takeaways:

1. Exploring a research driven approach to differentiation.
2. How to phrase questioning to foster critical thinking and problem solving.
3. Developing hands on activities to support key understandings in addition and subtraction

Remember: Delegates will not need any specific materials to attend this presentation.

### FULL B09 SPECIALIST MATHEMATICS: VECTOR CALCULUS AND NEW VECTOR CONTENT

(Unpacking high quality teaching, learning, and resources)

Peter Flynn, Texas Instruments  
(Year 11 to Year 12)

In this session, we will look at how TI-Nspire CAS can be used to enhance the teaching and learning of vector calculus and some of the new vectors content. Where appropriate, tips for efficient and accurate CAS use in Examination 2 will also be showcased.

### Key takeaways:

1. Visualising important concepts in vector calculus.
2. Using technology to enhance the teaching of vectors.
3. Enhancing efficient and accurate CAS use in Examination 2.

Remember: TI-Nspire CAS will be used. However, users of other calculators are most welcome.

### B10 LOGO TURTLE GRAPHICS PROGRAMMING USING PYTHON AND TI-NSPIRE

(Unpacking high quality teaching, learning, and resources)

Raymond Rozen, Yeshivah College and Shane Dempsey,  
Hamilton College  
(Year 9 to Year 12)

In this hands on workshop we are aiming high, but with no

programming experience, we can create colourful drawings and graphics by writing some code in Python using TI-Nspire V6.0. Python Turtle is a graphical add on module tool that can be used to draw simple graphics on the screen using the cursor, it was part of the Logo programming language. Activities in this session are suitable for Year 9 upwards and include stem with a bit of pseudocode.

### Key takeaways:

1. Programming skills.
2. Stem and pseudocode.

Remember: TI calculator or laptop with TI-Nspire

### B11 TAKING ACCOUNT OF BRAIN DEVELOPMENT IN THE TEACHING OF MATHEMATICS

(Focusing on the proficiencies at the heart of mathematics and numeracy learning, Exploring evidence for improving student achievement outcomes)

Marj Horne and Rebecca Seah, RMIT University  
(F to Year 8)

How does our brain develop during the years of school and how should that development impact on our teaching? This session connects aspects of brain development to learning and interacting and considers some impacts on teaching maths in the classroom leading to greater proficiencies in learning and mathematics.

### Key takeaways:

1. How brain development at different stages affects learning.
2. Teaching strategies connected to brain development.
3. Activities exemplifying key brain development components.

Remember: Paper and pencil.

### FULL B12 WHY EXTEND WHEN YOU CAN ENRICH?

(Unpacking high quality teaching, learning, and resources)

James Dann and Ashhad Ibrahim, Brighton Grammar School  
(Year 7 to Year 10)

All students have the right to experience a proficiency-rich mathematics classroom that provides opportunities to apply their knowledge to interesting, relevant problems. There is a temptation, however, to focus on the engagement of low to middle students and place high achievers in higher year level mathematics classes where they can execute the skills but do not necessarily understand the concepts. What's the rush? The top 25% of each year level should participate in an Enrichment Mathematics class in favour of placing a few very bright students in mathematics classes with the year above or - as in some well-resourced schools - pull students out of regular classes for activities that "make maths fun". We will describe a sequence and structure, with recommended curriculum and resources for the successful enrichment of able students. Workshop participants will examine their own mathematics structures and discuss how these ideas could be applied in their setting.

### Key takeaways:

1. Understanding the difference between enrichment and extension.
2. Competition mathematics and how it fits within the curriculum.
3. Accessing resources and curriculum for an enrichment maths program.

Remember: Delegates will access student.desmos.com during the session, which can be used on any mobile device, but the experience will be richer on a tablet or computer.

### B13 DISCOVERING MATHS THROUGH TANGIBLE EXPERIENCES: A VISUAL APPROACH.

(Unpacking high quality teaching, learning, and resources)

Shelley Pendlebury and Jessica Clark, Cornish College  
(Year 9 to Year 12)

Explaining a kite without a picture or image is possible. A lightweight object flies in the air using wind tethered to a person on the ground, usually by a string. However, draw an image of a kite, and a person's understanding develops further. Allow a person to touch, create, and fly a kite, and they will learn not just what a kite is but how it relates to the world around it. Providing opportunities for students to actively manipulate objects or explore with technology encourages problem-solving, identifying patterns, making connections, and communicating findings, greatly enhancing their visual understanding.

Together we will look at some activities and share experiential learning tasks involving manipulatives and technology (CAS) to encourage students to develop a visual understanding of maths concepts. Suitable for all secondary teachers with a focus on upper secondary.

### Key takeaways:

1. Value in students developing a visual understanding of Maths.
2. Effective way to develop visual understanding is through exploration of concepts and manipulation of hands-on resources.
3. Technology is an invaluable asset that empowers students to explore and delve into various concepts.

Remember: Participants are encouraged to bring a laptop, iPad or CAS calculator. (Some activities presented may involve using the TI-Nspire CX II CAS, however participants can bring a Casio).

### B14 GEOMETRIC CONSTRUCTIONS

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Neale Woods  
(Year 7 to Year 10)

This session will cover a range of compass and straight edge geometric constructions. These include angle and segment bisectors, circumcircles, inscribed and escribed circles, and other constructions culminating in the nine-point circle. The first part of the session will demonstrate by-hand constructions. The second part will show the constructions using TI-Nspire technology (both CAS and non-CAS). The third part will show the constructions using a variety of other technologies such as ClassPad, GeoGebra, Geometry Expressions, GX Web and Cabricloud.

### Key takeaways:

1. Historical perspective on compass and straight edge geometric constructions.
2. Skills obtained in the use of TI-Nspire technology geometry application.
3. Recognition of a variety of geometry software available to enhance student learning.

## SESSION B: Thursday, 12.10pm-1.10pm (cont.)

Remember: Participants are encouraged to bring a TI-Nspire handheld or a laptop with TI-Nspire software. Other geometry software can be installed beforehand or accessed during the session.

### B15 UNDERSTANDING ASYMPTOTIC BEHAVIOUR OF RATIONAL FUNCTIONS; DEALING WITH DIFFERENTIAL EQUATIONS

(Unpacking high quality teaching, learning, and resources, Exploring evidence for improving student achievement outcomes)

**Greta Gomes, Stonehill International School and Shubhankar Roy, Woodstock School, Uttarakhand (Year 9 to Year 12)**

This presentation highlights the objectives of a study focusing on two areas of research. Firstly, it investigates the impact of oblique asymptotes on the graphical behaviour of rational functions. By comprehending the fundamental principles of rational functions and their asymptotic behaviour, the study establishes the conditions for a rational function to possess an oblique asymptote. Through in-depth analysis using calculus, algebraic manipulation, and graphical representation, the behaviour of rational functions in proximity to oblique asymptotes is examined. The exploration of various scenarios involving intersections or coincidences with other asymptotes sheds light on the interplay between different asymptotic behaviours, particularly for quadratic by linear rational functions.

Secondly, the study addresses the challenges faced by students when solving first-order differential equations using four different methods. By scrutinizing student answer scripts and identifying various problem-solving errors, the research aims to enhance teaching strategies and emphasize crucial points in the problem-solving process.

#### Key takeaways:

1. Understanding the asymptotic behaviour of rational functions through its graphs and equations.
2. Making differential equations approachable and student centric.
3. Minimizing errors while solving differential equations building applications with real life.

Remember: Laptop, TI Nspire Cx-II emulator

### B16 IMPLEMENTING PSEUDOCODE AND ALGORITHMS IN PYTHON ON COMPUTER AND CAS

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Enzo Vozzo, Mentone Grammar (Year 9 to Year 12)**

The introduction of Pseudocode in the new Mathematical Methods and Specialist Mathematics Study Design indicates that algorithms and coding are beginning to be seen as important. This presentation introduces the three key elements of algorithm design: sequencing, decision-making and repetition. These elements will be implemented using the popular open-source computer language Python on a computer and on the new TI CAS nspire CX II calculator, which has Python built into it. Delegates will have the choice of coding a variety of simple algorithms to calculate the value of pi (using the bisection method), generate Pythagorean triples and primes, run simulations and define (create your own) mathematical functions such as factorials, sine and square roots. Python also handles complex numbers, with the ability to calculate Euler's identity in a single line of code! No experience of coding or Python is required but would be beneficial.

#### Key takeaways:

1. Introduction to pseudocode and algorithm design: sequencing, decision-making and repetition.
2. Introduction to the popular open-source computer language Python.
3. Choice of writing code to calculate the value of pi, generate Pythagorean triples, primes, run simulations, and define functions such as sine and square roots in terms of elementary arithmetic.

Remember: Delegates do need to have Python installed on their computer as we will either install in from the Python.org or use a web-based version. Delegates should bring their laptop and/or TI CAS nspire CX II which has Python built in. Python is not available on the Casio ClassPad FX-CP400.

### B17 REFINING QUESTIONS SKILLS TO FORMATIVELY ASSESS STUDENT UNDERSTANDING

(Unpacking high quality teaching, learning, and resources, Improving assessment, through balancing formative and summative approaches, Focusing on the proficiencies at the heart of mathematics and numeracy learning, Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Robert Kaplinsky - International presenter (F to Year 12)**

It's common for us to believe that a student understands a concept when we give them a problem and they reply with the correct answer. Unfortunately, sometimes we later find out that the student did not actually understand what they were doing and instead got the correct answer through a series of fortunate accidents. This is not ideal, so we'll practice asking questions we can use with students to formatively assess their understanding in real time and get useful information about what they know while we still have a chance to do something about it.

### B18 FROM MARKET STALLS AND MOCK ECONOMIES TO MEANINGFUL MATHEMATICS

(Unpacking high quality teaching, learning, and resources, Exploring evidence for improving student achievement outcomes)

**Dr Carly Sawatzki, Deakin University/The Centre for Research for Educational Impact (REDI) (F to Year 8)**

Research identifies that teachers think financial education is important. However, they often lack confidence in this area, because they transact differently to young people, and they are unfamiliar with the sorts of modern financial contexts that can connect students' real and mathematical worlds. In this workshop, participants will explore what primary students need from their financial education in an increasingly digitised financial world, and how you can influence change in this direction within your school. Learn by experiencing tasks and pedagogies that make mathematics meaningful for teachers and students alike.

#### Key takeaways:

1. Insights into educational research in Australia and overseas.

2. Insights into the new Victorian Curriculum: Mathematics.
3. Examples of innovative tasks and pedagogies.

### B19 DEVELOPING AND CONSOLIDATING BASIC NUMBER FACTS WITH CARDS

**Cancelled due to low numbers**

Commercial presentation

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**David Dunstan, AISWA (Association of Independent Schools of Western Australia) (Year 3 to Year 8)**

In this session, participants will be introduced to a sequence of card game applications, for the learning of basic number facts, using COMBO cards. The games, which are linked to the Australian Curriculum, will initially practice addition and subtraction facts and progress to using all operations. Participants will receive a pack of COMBO cards and a booklet of games created by Paul Swan and David Dunstan.

#### Key takeaways:

1. Building a positive disposition for learning basic number facts for teachers and students.
2. Experiencing the playing of the basic number fact games, that can readily be used in the classroom.
3. A sequence for learning basic number facts, that can be adopted as a 'whole school approach'.

### B20 EVIDENCE BASED SPACED PRACTICE

(Exploring evidence for improving student achievement outcomes)

**Anna McGann, Maths Pathway (Year 5 to Year 10)**

What is spaced practice? What is the most effective way of implementing spaced practice in the classroom to maximise student learning and outcomes? What are the key elements that need to be addressed when planning to incorporate this technique into your teacher toolbox? Whether you are a novice or a seasoned professional, come to this session to learn more.

## SESSION B: Thursday, 12.10pm-1.10pm (cont.)

We will share with you what the most cutting edge research and techniques are showing us in this area. We will also review “bad”, ineffective ways that spaced practice is currently being implemented in classrooms.

### Key takeaways:

1. What is spaced practice?
2. What is the difference between good and bad spaced practice?
3. How can we implement spaced practice?

### FULL B21 LEADING MATHEMATICS AND NUMERACY IMPROVEMENT: DEVELOPING YOUR STRATEGY

(Unpacking high quality teaching, learning, and resources)

**Kerryn Sandford, Heathmont College  
(F to Year 12)**

This session provides school leaders and leaders of Mathematics and Numeracy with a structure or framework to support the development of a strategy for improvement. It aims to support leaders to explore the key levers that schools can pull to leverage improvement and, most importantly, identifies the key resources (most of which are freely available) that can be used to support this work.

It is a high-level leadership guide but also provides a good summary of the key resources that are available at both the leadership and classroom level to support high-quality mathematics teaching as well as the teaching of numeracy across the curriculum (especially for secondary contexts). It is suitable for both primary and secondary leaders and educators and will look at the supports available across the lifespan for Mathematics and Numeracy education.

### Key takeaways:

1. Be aware of the five key levers they can choose to engage for mathematics and numeracy improvement in their schools.
2. Match these levers to the relevant and available resources.
3. Know where to go for additional help, advice, or guidance to support their team's efforts.

Remember: Participants are encouraged to download the “Numeracy Improvement Guide for School Leaders” from

the Department of Education website as this will be referred to quite heavily throughout the session.

### B22 WEAVING NUMERACY THROUGH ABORIGINAL STORYTELLING.

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Andrea O'Connor and Michael Chisholm, Catholic Education Sandhurst Ltd  
(F to Year 8)**

The ‘Weaving Numeracy through Aboriginal Storytelling’ workshop aims to support teachers to build confidence to meaningfully integrate the Aboriginal and Torres Strait Islander cross-curricular priority into mathematics. Andrea and Michael have worked collaboratively to explore the Dimensions of Multi-Cultural Education (Banks, 1995) and 8-Ways Pedagogy to develop a workshop which supports the idea of Equity Pedagogy and will provide ‘hands-on’ examples to take back to classrooms.

In the workshop, Aboriginal pedagogical approaches to support mathematical learning will be modelled in a creative and delineated way through storytelling and linking language, culture and country. Teachers will be provided with resources they will be able to share with their school community and to support the indigenising of the maths curriculum.

### Key takeaways:

1. To decolonise and indigenise curriculum.
2. Build teacher knowledge, understanding in Aboriginal Education.
3. To engage all students through Aboriginal Pedagogy in mathematics.

### B23 VISUALISING DECIMAL PLACE VALUE TO BUILD UNDERSTANDING

(Unpacking high quality teaching, learning, and resources)

**Antje Leigh-Lancaster, Leigh-Lancaster Consulting  
(Year 5 to Year 8)**

One of the challenges when developing understanding of decimal place value is to represent the size of the smaller

place values in correct proportion. In this hands-on session you will have the opportunity to engage with a fresh approach to introducing decimals (10ths, 100ths and 1000ths) using a combination of printed number lines, number talks and a specially developed number line template in Excel.

One of the benefits of using a spreadsheet is the visual representation of decimal place value and the relationships between them. This also leads nicely into equivalence and rounding.

Handouts and the Excel template will be shared with participants.

### Key takeaways:

1. An approach that enables students to see both the size of a decimal number and the relationship between decimal place values.
2. Pre-prepared Excel Visualising decimal place value template.
3. A2 and A3 printable templates for students.

### B24 FROM DISCOVERY TO GROWTH: MEASURING STUDENT LEARNING PROGRESS IN MATHEMATICS

(Exploring evidence for improving student achievement outcomes)

**Kylie Armstrong, Edenbrook Secondary College, Mitchell Land, Frankston High School and Craig Blake, Mathspace  
(Year 5 to Year 10)**

It's now common for schools to use technology to monitor and track the learning progress of their students in Mathematics. Two experienced teachers will present how their faculty has embedded technology for teaching & assessment of mathematics at their school.

As Mathematics Faculty Leader at Edenbrook Secondary College, Kylie Armstrong will share how the faculty use technology to track student learning, document student growth, and personalise learning in the classroom.

Mitch Land is a teacher at Frankston High School and he will share how they use technology to support the learning of students in Year 9 and 10.

Both Kylie and Mitch use Mathspace to identify learning gaps amongst their students and provide targeted teaching, so that all students can experience success in mathematics, regardless of their identified grade level.

### Key takeaways:

1. Find out how schools are using technology to track student learning progress.
2. Using data to provide targeted learning to students.
3. Using data to track and improve mastery

### B25 KICKING GOALS WITH TRIGONOMETRY: VIDEO-ENABLED MATHS IN THE REAL WORLD

(Unpacking high quality teaching, learning, and resources)

**Alastair Lupton, Adelaide Botanic High School  
(Year 9 to Year 12)**

“Do maths in the real world” is the cry. It adds meaning, relevance, and challenge, they say. Sounds good in theory – but what if I don't like excursions? Video is a great way of taking our students to the interesting real-world places, without leaving the classroom (and filling out a bunch of risk assessments). The rugby field, where a conversion kick is being attempted, is one such place (wrong code, I know, but can't be helped). This workshop will share a video treatment of the “rugby kick” problem, a lovely piece of applied right-angled trigonometry and includes ‘teacher edition’ notes and all you need for a great lesson, or a nice little assessment task.

### Key takeaways:

1. The rugby ‘conversion kick’ can be approached using trigonometry.
2. Numerical processes like angle determination can lead to optimisation problems that can be tackled effectively in the middle school.
3. Video is an effective way to bring the ‘real world’ into the classroom.

Remember: Participants should bring their choice of graphing/calculation technology - laptop or calculator will be fine.



# SESSION C: Thursday, 2pm-3pm

## C01 3 2 1 LAUNCH... THE STRUGGLE IS REAL

(Unpacking high quality teaching, learning, and resources)

Molly-Rose Clifton-Williamson, Libby Vanderwyst and Hung Vo, Deer Park North Primary School (Year 3 to Year 6)

Have you ever felt lost with how to approach a problem when planning? We have! Coming from a new team of teachers who have gone on the learning journey ourselves we look forward to leading you through different ways to plan and empower your skill set for more consistent outcomes.

Planning for problem solving? The struggle can be real. In our workshop, work with us on the ways to engage students through struggle time to develop their problem solving skills by perfecting the art of launching a problem.

Walk away from this workshop with different ways to launch a problem that you can build into your planning tomorrow. Prepare to challenge your thinking, be open minded and trust in the process. We've done it, so can you.

Join Molly, Hung and Libby to learn from our mistakes, mishaps and ultimate glory! Look forward to seeing you there.

### Key takeaways:

1. Something you can implement next week.
2. Experiment launching your problems in different ways.
3. How do you plan for a consistent approach to teaching and learning

## C02 SEQUENCING THE LEARNING OF MEASUREMENT CONCEPTS THROUGH CHALLENGING TASKS

(Unpacking high quality teaching, learning, and resources)

James Russo and Jane Hubbard, Monash University (F to Year 3)

This session will provide participants with a hands-on experience of three measurement sequences (length; perimeter and area; volume) relevant to the early years of schooling. Participants will consider how a pair of tasks underpin a learning suggestion, and how a series of connected learning suggestions make up a learning sequence. In addition, the workshop will highlight connections between

the three different measurement sequences, and provide suggestions for how each sequence can be extended into the middle and upper primary years.

## C03 EFFECTIVE TEACHER QUESTIONING TO ELICIT MATHEMATICAL REASONING

(Unpacking high quality teaching, learning, and resources, Exploring evidence for improving student achievement outcomes, Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Yun Chen, Dallas Brooks Community Primary School (F to Year 6)

There is a growing demand to develop learners' mathematical reasoning competence in today's mathematics classrooms. Teacher questioning strategy, such as the use of probing questions, is suggested by much literature to make the most impact on the development of the reasoning competence. Effective teacher questioning provides learners opportunities to evaluate and analyse mathematical thinking, strategies and concepts, and therefore support the elicitation of mathematical reasoning. However, given that persistent attempts to ask quality questions are evident in classroom instructions, challenges exist in how these questions are being managed and extended. In this workshop, you will be offered with a range of exploration opportunities, including role plays and scenario discussions to critically analyse the use of teacher questioning and to evaluate how these questions contribute to the elicitation of mathematical reasoning.

### Key takeaways:

1. Raise awareness of the importance of mathematical reasoning.
2. Provide opportunities for fellow educators to reflect and evaluate their uses of teacher questioning in mathematics classrooms.
3. It will increase teacher expertise in professional noticing, which will assist effective elicitation of students' mathematical reasoning.

Remember: Participants are encouraged to bring a piece of de-identified student work sample, showing either successes or misconceptions. These work samples will be used in group discussions during the workshop. However, there is no obligation if participants do not wish to bring any work samples.

## C04 AN INFORMAL INTRODUCTION TO COMPUTATIONAL THINKING

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

David Leigh-Lancaster and Antje Leigh-Lancaster, Leigh-Lancaster Consulting (Year 3 to Year 6)

In this activity-based session we will use two simple and engaging number games to illustrate a four-component model for computational thinking:

- abstraction (identifying important aspects)
- decomposition (breaking a problem into smaller, simpler parts)
- pattern recognition (identifying similarities)
- algorithms (step-by-step solution guides)

Computational thinking has been strengthened in the revised Australian and Victorian curriculums, join us to explore how this can be introduced in mathematics classes.

### Key takeaways:

1. A simple model for applying computational thinking in Levels 3 – 6 mathematics classes.
2. Two sample number games with worksheets that highlight the use of computational thinking.

## FULL C05 THERE ARE MANY WAYS TO TEACH MATHS WELL.

(Unpacking high quality teaching, learning, and resources, Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Aylie Davidson, Deakin University (F to Year 6)

Teachers often ask: What is the best way to plan a maths lesson? What types of tasks should I use? My initial answer is always: There are many ways to teach maths well. In other words, students need to experience the same idea/s in many different ways over an extended period of time to develop conceptual understandings and build mathematical connections. Using the context of multiplication, Aylie will simulate a series of connected learning experiences using a variety of high-quality tasks that emphasise the

four proficiencies: fluency, reasoning, problem solving and understanding. Participants will be invited to reflect and identify opportunities to strengthen their current planning and teaching routines.

### Key takeaways:

1. There is no single (right) way to teach mathematics.
2. Effective teachers use a variety of high-quality tasks.
3. Students need to experience the same idea, in different ways, over an extended period of time, to develop conceptual understandings in mathematics.

## C06 STOP, LOOK & LISTEN: WHOLE SCHOOL CHANGE FROM THE MIDDLE

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Emily Glen and Kate Molloy, Mount Pleasant Road Primary School (F to Year 6)

You're a passionate maths educator, you are full of great ideas and are in charge of leading change in your school. But where do we start? How do we unleash the potential of teachers and students? How do we value maths in our community?

From our own stories of practice, we will share how listening, leading by doing and leveraging strengths have transformed the mindsets of staff and students. We will also share many of the tasks and strategies that won the trust and hearts of not only students but the staff as well. In this hands-on, interactive workshop, we aim to equip you with things you can implement straight away in your classroom and wider school context. We will guide you through what it means to stop, look and listen to create meaningful change and help your staff have a bit of fun in the process.

### Key takeaways:

1. How do we engage our staff & students in having a positive mindset towards Maths?
2. How do we get our staff to value Maths in our community?
3. How do we keep the momentum for long-term changes?

## SESSION C: Thursday, 2pm-3pm (cont.)

### C07 MOVING STUDENTS FROM ADDITIVE TO MULTIPLICATIVE THINKERS

(Exploring evidence for improving student achievement outcomes)

Renee Ladner, St. Margaret Mary's School  
(Year 3 to Year 8)

In the early years of Primary School teachers and students devote a lot of time developing strategies and skills to become efficient Additive thinkers in preparation to become Multiplicative thinkers, but how do students make that shift? How can we ensure that students leave Primary School with the vital skills and strategies to apply to more advanced mathematics? It is a large leap and one that takes years to master, however, it is the biggest downfall for many students. Research from Di Siemon and her Big Ideas in Multiplication will highlight the sequence of learning required to deliver effective planning, teaching and learning through games, challenging tasks and other varying exposures. This will demonstrate how students can extend their thinking to become more efficient mathematicians and in turn, increase confidence in Mathematical application.

#### Key takeaways:

1. Sequence of learning for Multiplicative thinking.
2. Resources to use that promote Multiplicative thinking.
3. Multiplicative strategies.

Remember: Device, paper and pens.

### C08 A STRATEGY APPROACH TO TEACHING AND LEARNING

(Unpacking high quality teaching, learning, and resources)

Paul Staniscia, Southern Cross Grammar  
(F to Year 6)

Explicit Instruction vs Inquiry Learning. Determining which approach is better in mathematics is not a straightforward answer as it depends on various factors such as the age and background of students, the specific mathematical content, teacher capacity, pedagogical approaches and the learning outcomes, just to name a few.

A balanced approach that incorporates elements of both can be effective, allowing for direct instruction when necessary and providing opportunities for students to explore and

discover mathematical concepts on their own. Flexibility in choosing the teaching approach based on the specific learning goals and needs of the students is crucial.

However, how can we anticipate the strategies students will use? This workshop will explore effective classroom practice through the careful designing of a structured progression of strategies. Participants will identify strategies, construct a developmental progression of these strategies and craft Learning Intentions and Success Criteria that will provide clarity in the classroom.

#### Key takeaways:

1. How the Key Ideas support the teaching and learning of Mathematics.
2. How we explicitly teach strategies in Mathematics.
3. What students do and say when they use particular strategies.

### C09 SNAKES ALIVE! - AN INTRODUCTION TO PROGRAMMING USING PYTHON.

(Unpacking high quality teaching, learning, and resources)

Tim Grabovszky, The Hutchins School, Hobart  
(Year 7 to Year 12)

This hands on workshop will introduce you to the world of programming using Python. No previous programming experience is required as this will be focused on an introduction to coding in Python. Programming will be done on the TI-Nspire CXII graphics calculator (or computer software version). You will take away some basic programs and be able to further develop your skills in this increasingly important aspect of mathematics. If you do not have a handheld calculator, some will be available for use during the session. This session will be aimed at beginners.

#### Key takeaways:

1. Develop an appreciation of programming in Python.
2. Take away a few beginner programs.
3. Have the confidence and ability to try some programming and see how it can enhance student learning and thinking.

Remember: Bring your own TI-Nspire CXII calculator or computer software version. If you do not have your own then some will be available for use.

### FULL C10 A LOOK AT TEACHING GENERAL MATHEMATICS

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Mark Ljubic and Andrew Greville, St. Joseph's Secondary College Mildura  
(Year 11 to Year 12)

Andrew Greville has been teaching for 5 years with this year being his first foray into teaching a year 12 subject. Andrew has taught year 11 Maths Methods for all these years and now he has entered uncharted waters – yes teaching Year 12 General. Andrew will tell of his journey this year with the struggles and joy whilst working with his crew of 20 mostly motivated students. Captain Andrew will also be joined by first mate Mark Ljubic who has helped in steering the ship as they have navigated some quite treacherous waters. Andrew and Mark look forward to piping all new and emerging General Maths teachers aboard for a one-hour journey that explores challenges in curriculum preparation, delivery and of course those feared SAC's. A great opportunity for participants to develop new Networks with colleagues when sharing our common goal in getting the best possible outcomes for students.

#### Key takeaways:

1. Understand that the range of abilities in a General classroom varies more widely than in a typical Methods classroom.
2. Embrace the way in which the Course Work will be assessed. (SAC's).
3. Identify and use appropriate digital technologies to assist with student learning.

Remember: Bring a friendly and positive attitude.

### C11 TECHNOLOGY, IRRATIONAL NUMBERS AND THE MANDELBROT SET

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Daniel Milutinovic, Williamstown High School  
(Year 9 to Year 12)

Explore some of the algorithms used to display the digits of irrational numbers like  $\sqrt{2}$ ,  $e$  and  $\pi$ , as well as how to generate the Mandelbrot set. Participants will see how the algorithms

are implemented on the author's homemade calculator and receive pseudo code to assist them write their own programs.

Please note: code for TI and Casio calculators is NOT provided.

#### Key takeaways:

1. Illustrate the infinite and non-repeating decimal expansion of irrational numbers.
2. Show how a simple recurrence relation and basic operations on complex numbers can generate a complex structure.
3. Provide examples of how programming is used to explore mathematical concepts.

### C12 PREPARING STUDENTS FOR EXAMS

(Improving assessment, through balancing formative and summative approaches)

Peter Fox, Texas Instruments  
(Year 7 to Year 12)

What is the best way to prepare students for end of year mathematics exams? Evidence shows that a lot of students cram in the days leading into an exam, certainly not a particularly effective strategy. Some students claim they went 'blank' in an exam, is this real? What strategies are there to help avoid this situation. In this session we will discuss and experience a range of strategies to support student engagement, learning and success.

Under the right amount of pressure, a lump of coal is transformed into a diamond.

#### Key takeaways:

1. Forget the mistake. Remember the lesson.
2. Procrastination is the thief of time.
3. If it's important, you'll find a way, not an excuse.

## SESSION C: Thursday, 2pm-3pm (cont.)

### C13 SUPPORTING YEAR 7 - 9 STUDENTS SIGNIFICANTLY BEHIND IN MATHEMATICS.

**Exploring evidence for improving student achievement outcomes**

**Eugenie Kestel, Academic Clinics for Exceptional Students (Inc.)/ Monash University (researcher) (Year 7 to Year 10)**

This presentation will provide insights into the mathematics findings from the evidence review: Supporting students significantly behind in literacy and numeracy. A review of evidence-based approaches, by a co-author of the evidence review.

#### Key takeaways:

1. It is not too late to intervene for secondary students significantly behind in mathematics.
2. Multi-tiered systems of support (MTSS) are the most effective framework to deliver support for ALL students.
3. Beneficial instructional strategies were consistent across general mathematical skills, and specific skills including word problem solving.

Remember: Link to full report: <https://www.edresearch.edu.au/resources/supporting-students-significantly-behind-literacy-and-numeracy>

### C14 UNIT 3/4 FOUNDATION MATHEMATICS - THE FIRST YEAR

**Unpacking high quality teaching, learning, and resources**

**Catherine Bushell, Mount St Joseph Girls' College (Year 11 to Year 12)**

Unit 3/4 Foundation Mathematics was offered for the first time in 2023. This session will share how one teacher delivered the course, the resources that were available, the preparation and delivery of the SACs and the students who chose the subject. There will be the opportunity for anyone else who taught the subject this year to share their experience and some insight for anyone who may be teaching the subject on the next year or so.

#### Key takeaways:

1. Teaching Unit 3/4 Foundation Maths.

### C15 FROM TASKS TO LESSONS TO SEQUENCES

**Peter Sullivan, Monash University (Year 7 to Year 10)**

A first step in planning is to articulate key content goals (how and way). A next step is to choose tasks to engage students in problem solving (the session will use the context of surface area and volume). Then we need to structure lessons to include all students. Next, coherent sequences can be planned.

### C16 SORTING AND MATCHING TASKS

**(Unpacking high quality teaching, learning, and resources, Improving assessment, through balancing formative and summative approaches, Improving positive dispositions for teachers and students, valuing mathematics and its applications)**

**Matt Skoss, Centralian Senior College, NT (Year 7 to Year 10)**

This session will model a range of interactive Sorting and Matching Tasks originally developed by Prof. Malcolm Swan, from the Shell Centre, University of Nottingham. Some adaptations to the original tasks will also be modelled. Participants will have the opportunity to engage in the tasks as if they were students, with opportunities to share their reflections about pedagogical and assessment considerations.

#### Key takeaways:

1. Practical tasks to use from Years 7 – 10, with usage modelled for classroom settings.
2. A task structure able to be adapted for Senior Secondary and Primary Years.
3. Access to the resources to make their own class kits.

Remember: Notes and support materials for all resources will be provided via iCloud, Google Drive and DropBox links.

### C17 THREE ENGAGING METHODS TO UNCOVER AND FIX HIDDEN STUDENT MISCONCEPTIONS

**(Unpacking high quality teaching, learning, and resources, Focusing on the proficiencies at the heart of mathematics and numeracy learning, Improving positive dispositions for teachers and students, valuing mathematics and its applications)**

**Robert Kaplinsky - International presenter (F to Year 12)**

If you're like most teachers, then you know how frustrating it is when our students appear to understand our lessons, only to find out later that they had many misconceptions. Imagine instead that we had three strategies we could quickly incorporate to reliably spot and fix these issues. What's better is that students love doing them and they work even if students don't realize they have misunderstandings. You'll leave with ready-to-go resources and strategies.

### C18 USING A FANTASY BOARD GAME TO LEARN MATHS

**Commercial presentation**

**(Unpacking high quality teaching, learning, and resources)**

**Lucas Rocha (Year 5 to Year 8)**

In this session, the presenter will discuss how gamification can engage students in education and increase their willingness to embrace challenges. The presenter will discuss the use of a fantasy approach that incorporates gaming elements to build an ongoing challenge to students of physics and mathematics. After discussing the benefits of gamification, the presenter will introduce the board game he has been developing as a high-quality teaching resource capable of targeting learners from Year 5 to 8. The game provides students with a monster world, where they can build their own team and challenge others. Students must solve mathematical questions as they play the game in order to be victorious. A perfect balance of strategy, numeracy skills and peer interaction, which improves student engagement and contributes to a fun learning experience. The game can be used by educators and parents as an ongoing numeracy tool.

#### Key takeaways:

1. Using gamification to foster student engagement and improve their willingness to embrace challenges.
2. Learning how to use board games to run campaigns whilst teaching mathematics and retain student engagement.

Remember: Educators interested in the board game can register their expression of interest after the presentation. They will have the option to get updated news on the development of the game and be notified upon launch.

### C19 FROM DECI-PIPES TO DECI-MATS

**Cancelled due to low numbers**

**(Unpacking high quality teaching, learning, and resources, Focusing on the proficiencies at the heart of mathematics and numeracy learning)**

**Kris Westcott, Sackville Street Public School (Year 3 to Year 8)**

For many teachers, the go to manipulatives for teaching decimal fractions are MAB blocks and money. Both can confuse rather than support beginners. Complications with MAB include relating the blocks to whole number thinking and modelling decimals using discrete and/or area models. While money is a highly abstract representation, the smallest increment of Australian currency being the 5-cent piece, denying students the ability to build by hundredths (cents) up to the dollar. Further, the physical representation of 1-cent, 10-cent and \$1 are not proportional.

This hands-on workshop will engage participants, as a class of students, approaching their learning of decimals to one, two and three decimal places. The session will model a series of collaborative tasks that have engaged and supported students from Years 4 – 6 to develop a deep conceptual understanding of decimal place value. Participants will explore, structured and unstructured materials commencing with a purely linear model.

#### Key takeaways:

1. Lesson sequences that build deep understanding.
2. Resources that support conceptual understanding.



## SESSION C: Thursday, 2pm-3pm (cont.)

### C20 THE DIGITAL ASSESSMENT LIBRARY – PROVIDING MEANINGFUL MATHEMATICS ASSESSMENTS

(Exploring evidence for improving student achievement outcomes)

**Crystal Afitu and Zahara Forte, Victorian Curriculum and Assessment Authority (VCAA)**  
(F to Year 10)

The right classroom assessments can empower educators by providing a clear picture of student, cohort and whole school learning and progress.

The qualities that make an assessment include validity and reliability, alignment to the curriculum, and the quality of design.

The Digital Assessment Library (DAL), launched by the Victorian Curriculum and Assessment Authority (VCAA) in 2020, includes a suite of assessments, distinguished by content that is of high quality, designed appropriately to meet the needs of the classroom and is aligned to the Victorian Curriculum F-10.

The vision of the DAL is to support schools with selecting, administering, and analysing student achievement, and providing support to meaningfully interpret the results. We then provide support using the data to inform targeted and differentiated planning, teaching and reporting to improve student, class, cohort and whole school outcomes.

#### Key takeaways:

1. Navigating and selecting Curriculum aligned assessments in the Digital Assessment Library.
2. Making meaning of assessment results.
3. Reviewing actionable information that directly informs teaching and learning, for improved student and whole school outcomes.

Remember: It is not essential that all attendees have a laptop available or have access to the DAL already. However should participants wish to interact with the platform, the attendees can register their school prior for a more interactive session. [https://vcaa.au1.qualtrics.com/jfe/form/SV\\_7R1uVp9Mnd69bYW](https://vcaa.au1.qualtrics.com/jfe/form/SV_7R1uVp9Mnd69bYW)

### C21 THE BENEFITS OF USING MULTIPLICATIVE DIAGNOSTIC ASSESSMENT FOR TEACHERS

Cancelled due to low numbers

(Improving assessment, through balancing formative and summative approaches)

**Lei Bao, Deakin University**  
(Year 3 to Year 8)

This presentation will describe the features of Multiplicative Thinking Diagnostic Assessment. It shows the potential of using multiplicative word problems based on four key situations - equal groups, arrays, multiplicative comparison and Cartesian product - as a diagnostic assessment to reveal students' transition barriers from additive thinking to multiplicative thinking. It also discusses the benefits of using this assessment for teachers in the middle and upper primary years.

#### Key takeaways:

1. This presentation shows the importance of Multiplicative Thinking Diagnostic Assessment for identifying students' transition barriers during their development and supports teachers' understanding of students' transition barriers from additive thinking to Multiplicative Thinking.
2. It provides teachers with research-based assessment items for the purpose of formative and summative assessment.

### C22 THE AMAZING BEGINNINGS OF MATHEMATICS THAT WE USE EVERYDAY

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Calvin Irons, Mathema Foundation and ORIGO Education and James Burnett, ORIGO Education, Queensland**  
(Year 5 to Year 8)

We live in an ever-changing digital world with computers, phones, cars and dozens of other conveniences that rely on mathematics. But, what mathematics powers the technology, keeps us in digital contact and directs us as we navigate the globe? When and where did that mathematics begin? Much of this essential mathematics has its origins long ago - in some cases it is thousands of years ago. This session will describe those origins in ways that can be used directly in the classroom from cultures such as Mesopotamia, Egypt, Harappa, China,

Mesoamerica and the Andes. This session will share hands-on activities from across all strands of mathematics that will provide a very high level of interest for students from the upper primary years and beyond.

#### Key takeaways:

1. Activities that will enrich the mathematics that is taught in classrooms.
2. Examples of mathematical connections to cultures familiar to many Australians.
3. Ready to use classroom materials with historical significance to the mathematics curriculum.

### C23 GETTING THE MOST FROM FX DRAW

Commercial presentation

(Unpacking high quality teaching, learning, and resources)

**Paul Hooper, Efofex Software**  
(Year 7 to Year 12)

FX Draw has allowed mathematics teachers to draw high-quality mathematics diagrams for nearly thirty years. This session will help you use this incredibly powerful product to its fullest extent. Whether you are new to FX Draw or have been using it for years, you will walk away with hints and tips that will make your life easier.

#### Key takeaways:

1. See what's new in FX Draw.
2. Ask questions and get answers from the lead programmer for Efofex.

Remember: If you wish to experiment with FX Draw during the presentation, please ensure that you have pre-installed a current version of FX Draw Tools.

### C24 PROBLEM-SOLVING PROCESS, PROSPECTIVE MATH TEACHERS, TI-NSPIRE-CAS CALCULATOR & CHATGPT, EXPLORING TASKS

(Unpacking high quality teaching, learning, and resources)

**Cho Cheong-Soo, Wenting Liu and Ye Ji Park, Yeungnam University Korea**  
(Year 11 to Year 12)

The objective of this study is to compare problem-solving processes of TI-Nspire CAS calculator and ChatGPT in exploring tasks. A total of 17 prospective secondary mathematics teachers, currently enrolled at a private university in Korea, were selected as participants. They were given an investigative task related to polynomial functions, rational functions, and regression analysis to solve. The participants were provided with 50 minutes each to solve the tasks using both TI-Nspire CAS and ChatGPT. According to the findings, the participating students first posed various questions to ChatGPT to identify problem-solving strategies for the tasks. They then utilized TI-Nspire CAS to implement the specific execution of those strategies. Furthermore, the participants demonstrated a tendency to utilize ChatGPT when interpreting and inferring conclusions from various numerical information obtained through the use of TI-Nspire CAS. They relied on ChatGPT to aid in the interpretation and analysis of the results for the tasks.

#### Key takeaways:

1. TI-Nspire CAS is implemented the specific execution of problem-solving strategies.
2. ChatGPT is utilized when interpreting and inferring conclusions from information.
3. ChatGPT to aid in the interpretation and analysis of the results for the tasks.

## SESSION C: Thursday, 2pm-3pm (cont.)

### FULL C25 CAS TECHNIQUES FOR MATHEMATICAL METHODS AND EXAMINATION 2 SOLUTIONS-CAS

(Unpacking high quality teaching, learning, and resources)

Sanjeev Meston, Firbank Grammar School  
(Year 9 to Year 12)

This session will focus on the use of the TI-Nspire CAS technology in a Mathematical Methods class to analyse and learn Mathematics using CAS. The TI-Nspire is an extremely powerful learning and teaching tool in a Mathematics classroom. This session will bring out efficient ways of responding to EXAM 2 and SAC questions. As a part of this session, the attendees will have access to CAS solutions for the 2023 Examination -2 for both VCE and VCE NHT Methods exam. This has been a very popular session amongst VCE Methods teachers (both for experienced and new).

#### Key takeaways:

1. Become more proficient with the USE of TI-Nspire CAS technology and use it as a powerful teaching and simulating tool.
2. Improve student conceptual understanding and learning outcomes in the Mathematical Methods course.
3. Make Maths learning engaging, productive and enjoyable.

Remember: It will be helpful if you attend the session with either the Teacher software on your Laptops or alternatively with the TI-Nspire Hand held.



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## SESSION D: Thursday, 3.10pm-4.10pm

### D01 HAPPY NUMBERS: AN ENJOYABLE NUMBER INVESTIGATION!

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Peter Sanders  
(Year 5 to Year 6)

Happy numbers is a fun and engaging upper primary number investigation that utilises square numbers, and helps develop a positive disposition towards mathematics teaching and learning. The session builds upon an earlier presentation at this conference by Ray Peck in 2003 entitled, "Are your students 'happy', 'perfect' or 'amicable'?", and includes ideas from subsequent investigations the presenter has undertaken on happy numbers with upper primary and tertiary students.

Happy numbers were invented, apparently, by a young girl playing with numbers. They provide an excellent stimulus for a number investigation as they occur (about 1 in 7 numbers are happy) frequently enough for success and excitement to happen, but not too frequently, so productive struggle is required. The investigation leads to 'sad' numbers being uncovered and hence defined and the exploration of number patterns. The latter stages of the investigation link mathematics with literacy.

#### Key takeaways:

1. You will take away a fun and engaging upper primary number investigation that will help create a positive disposition towards mathematics amongst your students.

Remember: pen and paper and a willingness to take part in a collaborative number investigation is all that's required!

### D02 WHAT CAN A DRAWING SAY? STORIES FROM F-2 STUDENTS' CLASSROOMS

Unpacking high quality teaching, learning, and resources

Ellen Corovic and Ann Downton, Monash University  
(F to Year 2)

In this session we will explore students' drawings, symbols and words as representation of their mathematical thinking. Participants will experience a selection of early number and geometry challenging tasks developed by the EMC3 research team. Together we will interpret F-2 work samples to explore a developing progression of representations and thinking. Participants will gain further insights into the meaningfulness of students' representations as evidence of their learning.

### FULL D03 ASK & LISTEN: USING FORMATIVE ASSESSMENT & QUESTIONING TO IMPROVE STUDENT ACHIEVEMENT

(Improving assessment, through balancing formative and summative approaches)

Commercial presentation

Cassandra Lowry, University of Newcastle  
(F to Year 6)

Too often in classrooms teachers make decisions about a diverse group of learners based on the responses of one or two. They bemoan the results of end of unit tests and complain that students lack the ability to recall key concepts when topics are revisited. This workshop will aim to address these issues. It will demonstrate to participants various formative assessment strategies that can be used to re-frame the learning as it is happening. It will model the use of different questioning techniques to help the teacher better understand the needs of all learners and it will explore the way feedback tools can be used to not only identify areas for future learning, but also provide information to the teacher about the success or limitations of the lesson.

#### Key takeaways:

1. Increased knowledge of formative assessment strategies.
2. Improved understanding of various questioning techniques.
3. Using student feedback to highlight the success and limitations of lessons.

### FULL D04 BUT WHERE IS THE EXPLICIT TEACHING IN RICH TASKS?

(Unpacking high quality teaching, learning, and resources)

Marissa Cashmore, Motivating all Maths Learners to Succeed  
(F to Year 6)

As an advocate for rich, open ended primary maths teaching, and a leader in maths education, we are constantly faced with the following comments and question:

"Where is the explicit teaching?"

I'm sure, as you have tried to implement Rich Tasks, that you may be battling with these questions in your own head



## SESSION D: Thursday, 3.10pm-4.10pm (cont.)

and this may be the reason you avoid inquiry based maths learning.

This workshop will demonstrate and help you better understand what explicit teaching actually is, the misconceptions and the benefits of using rich, authentic mathematics in your teaching.

### Key takeaways:

1. Strategies for effectively teaching with rich mathematical tasks.
2. How to identify explicit teaching moments.
3. Task ideas to use in your classrooms.

## D05 ANTICIPATING STUDENT LEARNING

(Unpacking high quality teaching, learning, and resources)

**Michael Logan, Will Davey and Catherine Shepherd,**  
**Albert Park Primary School**  
**(Year 3 to Year 6)**

Structure based on PMSS sessions - have been approached by PMSS staff to apply for this to share our experiences (with offer of coaching)

Modelled open ended task from PMSS initiative (with permission of presenters), or a self-developed open ended task that can be adapted for Grade 2-6 (or beyond). Participants engage in the mathematics of the task.

Support participants to anticipate misconceptions, key learning and developing prompts to enable or extend task.

Story of practice - introducing student responses (photos, work samples, quotes or videos), sharing successes / mistakes and deciding together on next steps for students.

Time permitting: Participants develop a consolidating task to allow students to reapply skills (becoming more fluent), and change the context slightly (multiple exposures). Participants test their consolidating task and develop extending prompts.

### Key takeaways:

1. How to develop lessons with low floors and high ceilings.
2. Ways to anticipate student responses and be prepared (to enable / extend).
3. Consolidating student learning with follow up lessons that build / connect to each other (sequentially).

## D06 EXPLORING MUDDY CITY TASKS IN SPECIALIST SETTING IN MIDDLE YEARS

### Cancelled due to low numbers

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Jenny Slusher, Emerson School**  
**(F to Year 6)**

Join us for an enlightening workshop that highlights the potential for adapting mainstream math activities for special schools. Drawing from my personal experience and encounters at a conference, where I was presented with the "Muddy City" activity, we will explore the transformative power of such adaptations in enhancing students' mathematical problem-solving abilities.

Through this workshop, we will delve into the methodology of starting with concrete objects as a foundation for problem-solving. We will explore how this approach can be applied in various mathematical contexts, enabling students with special educational needs to tackle advanced mathematical problems successfully. By sharing practical examples and strategies, we will empower educators to adapt and modify mainstream math activities to suit the needs of their special schools.

### Key takeaways:

1. Most tasks can be adapted to suit multiple contexts including special ed.
2. Students can learn difficult concepts as long as they are presented in a manner that scaffolds their learning.

Remember: Delegates will need a pencil, (paper will be supplied) and an inquiring mind open to diverse educational settings.

## D07 INTRODUCING THE MOST VERSATILE MATHS MANIPULATIVE: THE REKENREK!

### The presenter has cancelled this session

(Unpacking high quality teaching, learning, and resources, Focusing on the proficiencies at the heart of mathematics and numeracy learning)

### Commercial presentation

**Amy How, Rekenrek101/ Amy How Limited**  
**(F to Year 4)**

Have you heard about this versatile, visual, concrete manipulative? Perhaps you are curious... or even skeptical? If you are interested in encouraging mathematical talk, reasoning, deeper understanding and daily practice in a hands on visual method, then this session is for you. You truly have to see it to believe it. This is your chance to have a go at a few hands-on tasks. You will be amazed at how this tool can be the mess-free answer for children developing deeper understanding of number sense while naturally engaging in rich mathematical talk. Join in on this introductory rekenrek workshop and hopefully you too will be singing the praises of this simple tool.

### Key takeaways:

1. Seeing the power of using manipulatives to teach greater mathematical understanding.
2. Encouraging mathematical talk and reasoning in our youngest mathematicians.
3. Gain ideas for simple, mess-free activities.

Remember: Mobile phone to access free app

## FULL D08 CHECKING IN ON LEARNING - THE POWER OF ONGOING ASSESSMENT

(Improving assessment, through balancing formative and summative approaches)

**Ruth Staniscia, St Peter Chanel School**  
**(Year 3 to Year 6)**

Ongoing assessment is an essential aspect of education as it offers valuable insights into students' progress and informs instructional decisions. Check-In Slips, when utilised throughout the teaching of mathematical concepts, provide real-time understanding of students' strengths and areas for improvement. They serve as powerful tools for teachers to interpret and apply data, enabling them to tailor their approach and provide targeted interventions that cater to individual needs.

In this workshop, participants will gain a comprehensive understanding of the development, implementation, and analysis of Check-In Slips and how they can be used effectively to meet the diverse needs of students in the classroom. By delving into the various ways Check-In Slips can be integrated into instruction, educators will be equipped

with valuable insights and techniques to enhance their ongoing assessment practices and maximise student learning outcomes.

### Key takeaways:

1. Ongoing assessment provides invaluable insights that guide instructional decisions.
2. The utilisation of Check-In Slips enables real-time comprehension of student strengths and areas for improvement.
3. The implementation of personalised instruction through tailored approaches enables the vast and varying needs of all students to be met.

## FULL D09 ONE COLLEGE'S JOURNEY INTO TACKLING NUMERACY ACROSS THE SECONDARY CURRICULUM.

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Samantha Horrocks, Benjamin Cooper and Mark Collins,**  
**Northern Bay P-12 College**  
**(Year 7 to Year 12)**

Northern Bay College has committed itself to looking at how to approach numeracy across a multi-campus P-12 College. The senior (9-12) campus would like to share the highs, lows, challenges and success in our initial approaches to Numeracy across all secondary curriculums. We will share the why, how and what we have used and discovered in order to help those embarking on a similar journey. We will be looking at growth mindset, mathematical agency, numeracy friendly classrooms, student and teacher dispositions, positive struggle and how to identity, utilise, scaffold and strengthen teachers' and students' numeracy skills for different secondary curriculum subjects.

### Key takeaways:

1. Do and don't for tackling this journey.
2. Ideas for approaches to PD for staff.
3. Actual strategies employed in classrooms.

Remember: Nothing required but an open mind



## SESSION D: Thursday, 3.10pm-4.10pm (cont.)

### D10 STRENGTHENING THE CONNECTION BETWEEN QUADRATICS EQUATIONS AND PARABOLAS

(Unpacking high quality teaching, learning, and resources)

**Echo Gu, Lauriston Girls' School and Jiqing Sun, Deakin University**  
(Year 9 to Year 12)

This session showcases a teaching sequence that aims to help students build connection between quadratics and parabolas. A variety of teaching tasks are implemented to address graphics features of parabolas (such as symmetry property), as well as their relationship with algebraic manipulation of quadratic functions (such as finding axis of symmetry, or x-coordinate of turning point). A range of carefully designed assessment items are experimented to assess students' understanding of the concepts beyond procedure work. Some findings from students' work will be shared and discussed. Close analysis of these tasks will be presented to evaluate students' learning and to inform future teaching. Details from the Australian Curriculum 9.0 will be highlighted and examined.

#### Key takeaways:

1. A carefully designed teaching sequence aims to help students build connection between quadratics and parabolas.
2. A range of tasks focus on addressing features of parabolas, and their connections with algebraic manipulation of quadratic functions.
3. Use of technology as a teaching instrument, instead of an assessment tool.

### D11 HAVING SOME FUN WITH NUMERACY AND MATHS

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Dave Tout, Australian Council for Education Research (ACER) and Multifangled**  
(Year 7 to Year 12)

This practical, hands-on workshop will enable participants to experience different games and activities suitable for classroom use with a range of numeracy and maths students. The activities focus on the development of core maths skills through the use of games, real-life and hands-on materials,

as well as on enjoyment and having fun with maths. Some are whole group activities, others are small group work and others take an individual focus. The activities will illustrate alternative approaches to the traditional worksheet or textbook approach for teaching numeracy and maths. The activities have mainly been developed for youth and adult numeracy students but are suitable for all students, especially middle years and VCAL/VCE VM students.

#### Key takeaways:

1. Games and activities to use in your classrooms that are suitable for use by a range of students.
2. How games and activities can support a range of different positive outcomes for both the learner and the teacher.

### D12 SUCCEEDING WITH NETWORKS IN GENERAL MATHEMATICS

(Unpacking high quality teaching, learning, and resources)

**Anthony Davies, Southern Cross Grammar**  
(Year 11 to Year 12)

Networks has historically been found difficult by students in Year 12. As we move toward a new study design which has all students now completing the networks and decision mathematics module, we should take some time to discuss some beyond-the-book strategies for year 12 students looking to make a mark on their end of year examinations.

Those final few exam questions may present students with problems that require a firm understanding of how to deal with crashing or, at the very least, activity networks.

We will, together, explore some of the more difficult question types that students have been presented with over the years and discuss some strategies for students to more efficiently deal with activity network questions, including an emphasis on:

- Time-savers in exams
- Calculating float time without 'the boxes'
- Approaching crashing/crashing-with-cost questions

#### Key takeaways:

1. A firmer understanding of the kinds of results we can expect from students completing the networks and decision mathematics module, based on past years exams.

2. How to approach difficult crashing questions within networks.

3. Some alternative methods to deal with activity network questions.

Remember: Please bring a laptop and writing implements.

### D13 MIXED SIX TASKS - A FRAMEWORK FOR ASSESSMENT AND PROFICIENCIES

(Focusing on the proficiencies at the heart of mathematics and numeracy learning, Exploring evidence for improving student achievement outcomes)

**James Mott, Southern Cross Grammar**  
(Year 7 to Year 12)

In this session, attendees will learn how to create a 'mixed six task' - six questions of increasing complexity based on Bloom's taxonomy in a mathematics context which also address the mathematical proficiencies. From 'factual recall' to 'critiquing a fallacy', the structure of a mixed six task can be applied to any topic across years 7-12. Attendees will be provided with practical guidance on how to write questions that target different levels in Bloom's taxonomy and see how they can be mapped to the mathematical proficiencies. The 'mixed six task' framework can also be used as a lens to evaluate the types of questions that students are asked in assessments and how to modify questions to ensure that the mathematical proficiencies are being addressed. Attendees will be provided with samples of 'mixed six tasks' across the curriculum.

#### Key takeaways:

1. How to write questions that address the mathematical proficiencies.
2. Gaining an alternative perspective to writing tests for Years 7-11.

### D14 HOW TO EFFECTIVELY USE THE TI-NSPIRE TO CODE IN PYTHON.

(Unpacking high quality teaching, learning, and resources)

**Steve De Domenico, Ivanhoe Grammar School**  
(Year 11 to Year 12)

As pseudo code becomes more embedded in the VCE Mathematics study design, this presentation gives teachers a hands-on experience on how to move towards programming in python. I will explain the coding environment, including menu items, through the use of meaningful samples that can be replicated in the classroom. In addition, I will provide coded examples for participants to explore with colleagues on their return to school. This course will give participants confidence when using the TI-Nspire programming environment as an effective teaching tool.

#### Key takeaways:

1. Confidence in using the TI-Nspire python programming application; worked examples to use within the classroom; a discussion point with colleagues on how to effectively meet the needs of the new study design regarding pseudo code.

Remember: Delegates will need to bring either a TI calculator or TI software emulator; a Casio calculator will not be accommodated.

### D15 AIMING HIGH: REACHING FOR THE STARS WITH TIME-LAPSE PHOTOGRAPHY ANALYSIS

The presenter has cancelled this session

(Unpacking high quality teaching, learning, and resources)

Commercial presentation

**Brian Lannen, Murray Mathematics Curriculum Services**  
(Year 7 to Year 10)

Participants will examine a time-lapse photograph of the night sky and conduct measurements and calculations to enhance what they see. Learn how any photograph you take can be imported to your TI-Nspire™ device where it is then easily explored by a suite of mathematical tools.

#### Key takeaways:

1. Integration of technologies - photos and calculator.
2. Connections between lines, angle and time.

## SESSION D: Thursday, 3.10pm-4.10pm (cont.)

### FULL D16 EFOFEX MULTIDOCs - CREATE SELF MODIFYING MATHEMATICS DOCUMENTS!

(Unpacking high quality teaching, learning, and resources)

Commercial presentation

**Paul Hooper, Efofex Software  
(Year 7 to Year 12)**

MultiDocs is a new way to use FX Draw and FX Equation that allows you to create self-modifying tests, exams and worksheets. Get new versions, with new numbers, new diagrams and new, fully worked solutions - all at the push of a button. This session will introduce you to this new technology and get you on your way to creating your first MultiDoc. It is for any teacher who wants to save time.

#### Key takeaways:

1. Learn How To Use FX Draw and FX Equation To Create MultiDocs.
2. Investigate how the power of parameters and the inline calculator allows you to create questions with hundreds, thousands or even billions of variations.

### D17 INVESTIGATIONS - A TALE OF TWO CALCULATORS

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Brett Stephenson, Guilford Young College and Leilani Stephenson, University of Tasmania  
(Year 7 to Year 12)**

This workshop will look at an approach to a number of investigations including Benford's law and Jumping Kangaroos (including using regression analysis) that can be done with either a new scientific calculator and/or a graphics calculator. Some data will also be collected with probes using the CMA device. The Casio Classpad and 8200 will be used for demonstration but any technology could be utilised.

#### Key takeaways:

1. Improved use of new technology
2. Awareness of investigation opportunities

Remember: The workshop will be accessible for alternative

technologies even though the presentation will be demonstrated with Casio calculators. Casio calculators will be available to those who do not have one.

### FULL D18 SIMPLE, POWERFUL COLLABORATIVE PLANNING

(Unpacking high quality teaching, learning, and resources)

**Scott Hamilton and John Grinstead, Portland Primary School  
(F to Year 8)**

Scott and John will share their experiences with, and learnings from, a collaborative planning protocol introduced to them as participants in the 2021-22 Primary Maths & Science Specialist program. We have adapted this process and introduced it across the school for teams to use for planning sequences of rich and challenging tasks utilising all areas of team members strengths and skills. This process involves:

- unpacking the mathematics behind a challenging task
- anticipating student responses and developing your own teacher responses
- differentiating the task to enable success for all learners
- consolidating the learning with follow up tasks

This planning protocol allows teachers to develop sequences of learning that students to develop the 4+1 proficiencies, and utilise each others strengths while enabling powerful professional learning along the way.

#### Key takeaways:

1. The power and simplicity of a collaborative planning approach.
2. The importance of collaborative planning with your colleagues.
3. Turning a single rich, challenging task into a powerful learning sequence.

### D19 INTRODUCING THE MATHS IN SCHOOLS PROJECT

(Unpacking high quality teaching, learning, and resources)

**Celia Coffa, The University of Adelaide and John West Maths in Schools  
(F to Year 10)**

The Maths in Schools project provides free online professional learning courses for teachers of mathematics in schools across Australia. The online courses support contemporary evidence-based approaches to mathematics teaching from Kindergarten to Year 2, Years 3-6, and Years 7-10. A particular focus of the courses is the CRA model and culturally responsive mathematics pedagogies. The Maths in Schools project is hosted on the Mathematics Hub ([www.mathematicshub.edu.au](http://www.mathematicshub.edu.au)).

The University of Adelaide's Maths in Schools project is funded by the Australian Government Department of Education and is conducted in partnership with Education Services

#### Key takeaways:

1. Evidence-based approaches to mathematics teaching.
2. Culturally responsive mathematics pedagogy.
3. Hands-on learning using the Concrete-Representational-Abstract (CRA) approach.

Remember: Participants can bring their device and can access the free Maths in Schools project through the Mathematics Hub ([www.mathematicshub.edu.au](http://www.mathematicshub.edu.au))

### FULL D20 THE DO'S AND DON'TS OF A DIFFERENTIATED AND INCLUSIVE CLASSROOM

(Exploring evidence for improving student achievement outcomes)

Commercial presentation

**Luke D'Astoli, Maths Pathway  
(Year 3 to Year 12)**

A former primary teacher and lifelong maths enthusiast, Luke has spent the past seven years working with teachers to help them to implement a fully differentiated learning and teaching model. The hundreds of teachers Luke has worked

with have achieved substantial improvements to the growth their students achieve while creating a safer and more joyful classroom experience. Luke achieves these results by listening carefully and sharing actionable advice that is grounded in research while respecting the context, goals and readiness of the teacher.

In this workshop Luke will share some guiding principles to help you make a successful transition in your practice so you can help your students reach their mathematical potential.

#### Key takeaways:

1. Set students up for success.
2. Provide regular opportunities for authentic maths experiences.
3. Build strong relationships with your students.

### FULL D21 85% OF PEOPLE MISUSE STATISTICS!

(Unpacking high quality teaching, learning, and resources)

**Andrew Lorimer-Derham, Think Square  
(Year 3 to Year 12)**

In a world of fake news, false marketing claims and predatory gambling advertising, the skill of statistical reasoning has never been more important.

Participants of this playful workshop will gather data and creatively select statistical measures that 'prove' they are the best cup stacker...even if they're not!

Come prepared to engage in rich mathematical discussion as we evaluate truth claims and learn how easy it is to manipulate data to say what you want it to.

This is a hands-on workshop.

#### Key takeaways:

1. Participants will be provided with a low-floor high-ceiling statistics activity (Grade 3-12).
2. Fluency is best mastered in the context of solving interesting problems.
3. Critical and creative thinking is key to students truly understanding and interpreting data.

## SESSION D: Thursday, 3.10pm-4.10pm (cont.)

### D22 PUTTING ROTE LEARNING IN ITS PLACE

(Improving positive dispositions for teachers and students, valuing mathematics and its applications, Unpacking high quality teaching, learning, and resources, Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Joseph Wright, The Educational Advantage Pty Ltd  
(Year 5 to Year 10)

To thrive in the age of Artificial Intelligence, our students will need to be able to solve novel problems, think creatively and apply their learning in new ways.

To do this they need to possess a range of lower-level fluency skills, which require a significant amount of repetition to master.

This hands-on presentation will showcase a range of activities which develop basic mathematical skills, while at the same time providing a context where students can think creatively to apply these skills.

Memorising a process alone (e.g.. how to multiply by numbers 1-10) is only truly helpful if students can transfer what they know about the numbers 1-10 to solve ANY multiplication problem.

This session will provide activities that develop skill mastery and critical thinking. Activities that will inspire students to the point that they will want to continue the puzzles beyond the classroom.

#### Key takeaways:

1. What critical thinking through rich class activities.
2. Why Mathematical skills require a significant amount of repetition to master, leaving next to no time for reasoning and logical thinking.
3. How providing highly engaging tasks that allow students to practice basic skills without realising the high volume of questions they are doing.

### D23 COMPUTATIONAL THINKING IN THE AUSTRALIAN CURRICULUM: MATHEMATICS

The presenter has cancelled this session

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Rachael Whitney-Smith, Australian Curriculum  
Assessment and reporting Authority  
(Year 3 to Year 10)

The revised Australian Curriculum: Mathematics Version 9.0 includes new explicit content aimed at developing students' knowledge and application of computational thinking and explicit use of digital tools across the curriculum.

This workshop will explore the development of students computational thinking skills as they build in sophistication across the year levels. The computational thinking process draws on students' proficiency in mathematics to decompose, abstract, recognise patterns, create and use algorithms, generalise, experiment and conduct simulations. Computational thinking is an essential dimension of the contemporary discipline of mathematics and is key to becoming an informed citizen. Students develop an understanding of computational thinking in mathematics through the application of its various components. Digital tools can enhance the learning experience by providing students new ways to work, investigate and experiment mathematically.

#### Key takeaways:

1. This workshop will provide participants with a deeper understanding of computational thinking process in terms of Prep - Year 10 in the Australian Curriculum: Mathematics, and how computational thinking tasks and the use of digital tools can connect all three dimensions for the Australian Curriculum to the learning area of mathematics.

Remember: A digital device is an advantage such as tablet or laptop with internet capabilities.

### D24 LONG DIVISION - WOULD THAT IT WAS (STIKETHROUGH) WERE SO SIMPLE

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Eric Lindberg,  
(Year 5 to Year 8)

The session examines the traditional algorithms for the four basic operations of mathematics (addition, subtraction, division and multiplication) and uses examples to explain the reasons for error patterns that occur in hand computation (Ashlock 2009). It focuses on long division as the most difficult operation for children to understand and zeroes in on the algorithm introduced by Henry Briggs (1561-1630) as the root cause of the conflict between educational reformers and traditionalists (Rogers 2011; Wilson 2008). It explains how a new algorithm that breaks up the divisor into multiple terms is far easier to use in practice because it dissolves the blame game between educational reformers and traditionalists and shows that long division is really very simple with the right algorithm. It rigorously and thoroughly reinforces the fact that it's Briggs algorithm and not the teachers or students who are to blame for all of the errors in hand computation.

#### Key takeaways:

1. The existing algorithms for long division and long multiplication should be tossed onto the scarpheap of Elizabethan torture devices.

Remember: Long division introduced by Henry Briggs (1561-1630) is dead!

### D25 INTEGRATION BY MAFFSGURU AND NELSON VICMATHS

(Unpacking high quality teaching, learning, and resources, Exploring evidence for improving student achievement outcomes)

Darren Smyth, Melbourne Grammar School and Robert Yen, Cengage  
(Year 11 to Year 12)

MaffsGuru's Darren Smyth and VICmaths' Robert Yen unpack some past Maths Methods VCE questions on Integration. Hear some expert advice on reading and interpreting the questions, the allocation of marks, the common areas and errors, and the student performance for those questions. Learn some teaching tips and exam hacks for this topic.

#### Key takeaways:

1. Unpacking some past Maths Methods VCE questions on Integration.
2. Expert advice on reading and interpreting the questions, the allocation of marks, the common areas and errors, and the student performance for those questions.
3. Learn some teaching tips and exam hacks for this topic.



## MAV MEMBERS GET A DISCOUNT ON ALL STOCK

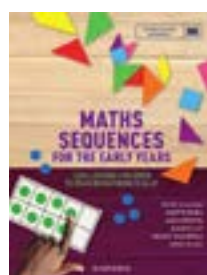


### THE ANIMALS WOULD NOT SLEEP

K-2

With bedtime fast approaching, young Latinx scientist Marco wants to sort his stuffed animals into categories that will help them comfortably settle down. He observes, compares, and groups, but the animals refuse every classification. Finally Marco combines math with empathy to get the most important result: maximum snuggles. The Storytelling Math series shows that all children can be mathematical thinkers. Each book includes ideas for exploring maths at home with children, developed in collaboration with maths experts.

**\$12.70 (MEMBER)**  
**\$15.90 (NON MEMBER)**



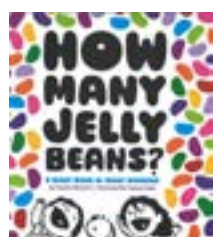
### MATH SEQUENCES FOR THE EARLY YEARS

F-2

Features original learning sequences designed specifically for teachers to use with students in Foundation to Year 2 and aligned with the content strands of the Australian Curriculum: Mathematics. The learning sequences focus on problem-solving as the 'beginning' of learning and understanding – problem-solving leads to reasoning, then builds understanding, and develops fluency through application.

Each sequence includes age-appropriate tasks with curriculum links, necessary language, readily available materials and resources, tips for launching the tasks and consolidating the learning, and suggestions for assessment.

**\$75.60 (MEMBER)**  
**\$90.70 (NON MEMBER)**

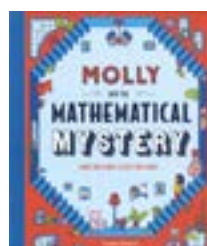


### HOW MANY JELLYBEANS?

F-6

How many jelly beans are enough? How many are too many? Aiden and Emma can't decide. Is 10 enough? How about 1000? That's a lot of jelly beans. But eaten over a whole year, it is only two or three a day. This giant picture book offers kids a fun and easy way to understand large numbers. Starting with 10, each page shows more and more colorful candies, leading up to a giant fold-out surprise - one million jelly beans! With bright illustrations and an irresistible extra-large format, this book makes learning about big numbers absolutely scrumptious!

**\$36.30 (MEMBER)**  
**\$45.40 (NON MEMBER)**

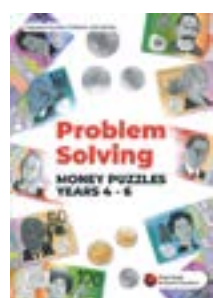


### MOLLY AND THE MATHEMATICAL MYSTERY

5-10

Find the clues and lift the flaps on this mathematical mystery! Join Molly as she ventures into a curious world where nothing is quite as it seems... a trail of clues lead from scene to scene, presenting Molly with a number of challenges. But who is leaving the clues and where will they lead?

**\$27.90 (MEMBER)**  
**\$34.90 (NON MEMBER)**



### PROBLEM SOLVING: MONEY PUZZLES

4-6

Part of the *Problem Solving* series. This book requires students to not only work out change, but use clues to determine what coins and notes were given in the change. Teachers may copy the cards and give to students to work on individually or in groups. Answers and comprehensive teaching notes are provided

**\$18.60 (MEMBER)**  
**\$23.25 (NON MEMBER)**



### 120 BUBBLE BOARD ADDITION

K-5

Learn addition facts to twenty with this durable 'pop and learn' addition board. Addends one to ten are represented on the vertical and horizontal axes with the correct sum presented in the corresponding bubble. Pop bubbles as you practice and solve the equation. Bubbles on the reserve side are blank and can be used for creating visual addition examples. An activity sheet is included with each purchase of a bubble board.

**\$40 (MEMBER)**  
**\$50 (NON MEMBER)**

**SESSION  
DETAILS**  
**FRIDAY**  
**1 DECEMBER 2023**

# KEYNOTES: Friday, 9.15am-10.15am

## KF01 EARLY MATHEMATICAL EXPLORATIONS: CONNECTING NUMERACY WITH EVERYDAY LEARNING

**Professor Nicola Yelland, University of Melbourne**  
(F to Year 2)

In this presentation Professor Yelland will explore the potential for authentic inquiries using mathematical concepts, skills and processes. She will discuss the importance of becoming numerate in multimodal learning ecologies in which children have the foundation skills in numeracy and literacy to engage with important ideas in meaningful ways. Professor Yelland will provide case studies of children investigating and experiencing their environs and making this learning visible in co-constructed learning documentation. Nicola will make links between her extensive research and practical examples of how an early years teacher can connect numeracy with everyday learning to enhance early mathematical explorations.

## KF02 CURRICULUM RESOURCES AS A VEHICLE FOR CHANGE: CAN THEY MAKE A DIFFERENCE?

**Nadia Walker, NSW Department of Education**  
(Year 3 - Year 6)

This session will explore opportunities for curriculum reform and curriculum support resources to affect change in the classroom. Internationally, high-performing school systems ensure teachers have access to materials such as lesson plans and sample assessments. In this session, we'll unpack a range of tasks and units of work and analyse the successes and challenges in developing system-level curriculum support materials at a state and national level. We will look at different system resources, such as those recently developed in NSW, and discuss the collaborative design project that worked with close to 300 primary teachers to develop the units for years 3-6.

## KF03 AIMING HIGH: WHAT DOES THIS MEAN FOR INDIGENOUS EDUCATION IN MATHEMATICS?

**Professor Chris Matthews, ATSIMA**  
(Year 7 to Year 12)

The theme of the conference is Aiming High: Continual improvement in mathematics education. My immediate thought was: How can this be achieved for Indigenous students across Australia? This is an important question given that the educational gap still persists for Indigenous students and, consequently, Indigenous peoples' mathematics education is usually relegated to numeracy. This keynote will explore how the system has historically created the gap and how the system perpetuates it. By understanding the "Educational Gap Dynamics", we will explore the positive changes in the system and the significance of teaching mathematics from a cultural perspective. The keynote will draw on examples from the classroom and highlight the connection between mathematics and Indigenous culture.

*This keynote presentation is supported by*



## KF04 STANDING ON THE SHOULDERS OF PRIMARY TEACHERS- LESSONS FOR A SECONDARY CONTEXT

**Michael Minas, Love Maths**  
(Year 6 to Year 9)

Traditionally, secondary maths classrooms have looked very different from their primary counterparts. However, the current trend of Foundation to Year 9 schools that have been springing up across Melbourne has created a major opportunity for the two sectors to learn from one another. Many of these F-9 schools are striving to create a seamless transition in mathematics learning for their year 6 students who are moving into year 7 by incorporating key elements from pedagogy used in the primary years. This process had led to challenging discussions about what exceptional maths teaching looks like and how we can ensure that all students have access to engaging, cognitive-challenging tasks.

This session will focus on how secondary educators can use key ideas and principles that are commonplace in many primary school classrooms to help improve student engagement and achievement in mathematics. Attendees will walk away with a range of practical ideas that they can try with their own secondary students immediately, as well as some big picture questions about what good maths learning looks like and what steps need to be taken to ensure this is happening in classrooms across your school.

Remember: For the best presentation experience, participants should bring a fully charged internet connected phone with headphones that connect to the phone. Make sure you have downloaded the YouTube app and can scan QR codes.

## FULL KF05 HOW I BLEND BUILDING THINKING CLASSROOM AND THE 5 PRACTICES

**Robert Kaplinsky, International Presenter**  
(F to Year 10)

Facilitating rigorous math problems with students can be a challenging balance between chaos and apathy. So, I'll share how I've blended my favourite parts of Building Thinking Classrooms and the 5 Practices to create a process that leads to engaged students making powerful insights.

The fx-8200 AU web-based emulator is now available!

To gain access to this free software, please ensure your faculty's Prime Schools Plus registration is up-to-date.

Scan below for more information.



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### What our educators say

Oliver's knowledge, professionalism, charisma, and effort have been **invaluable in my search** for a job in Melbourne.

Every interaction I had with Oliver further demonstrated his **proactive approach** towards his clients; this went from updating me with opportunities, to simply checking in to see how everything was going.

He **genuinely** wants what's best for you, and will strive to put you in touch with a **school that's right for you**.

Andrew. B - Teacher of Mathematics  
Trinity Grammar School

Stana provided an **excellent service** in finding me a new position.

She offered **valuable advice** in running me through a mock up interview prior to the actual interview, which was extremely helpful.

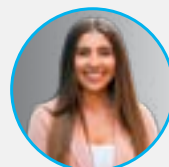
She followed through with all my concerns and **offered great recommendations of potential positions at various schools**. I highly recommend her.

Caterina. G - Senior Mathematics Teacher  
Sacred Heart Girls' College

### Meet the Team



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### Ready to get started?

If you'd like to talk to one of our consultants about how to get started simply email or call us and we will get in touch as soon as possible. We cannot wait to work with you soon.

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## SESSION E: Friday, 11am-12pm

### E01 GOING BEYOND 'SHARE TIME'

(Unpacking high quality teaching, learning, and resources)

Ellen Corovic, Monash University  
(F to Year 4)

The summary phase is an often overlooked part of the lesson with teachers frequently running out of time, or inspiration. In this session, Ellen will explore the importance of utilising the summary of the lesson to pull learning together in preparation for the following lesson. Several teaching strategies will be shared to help teachers' to go beyond the traditional 'share time' to connect and deepen student learning.

#### Key takeaways:

1. Inspiration for adapting teachers' usual summary routine.
2. Making connections between the summary of one lesson as the launch for the next.
3. Using concrete, pictorial, abstract representations to assist to deep students' knowledge during the summary phase of a lesson

### E02 EARLIEST EXPERIENCES WITH DIVISION

(Unpacking high quality teaching, learning, and resources)

Jill Cheeseman and Ann Downton, Monash University  
and Ben Dixon, St Thomas the Apostle  
(F to Year 2)

We have been aiming high with Foundation students. In this workshop we will describe our experiences of introducing young children to division using problem solving, games and dancing to music. The lessons we have trialled and children's responses to them will be shared. Participants are encouraged to bring along stories of activities that have worked well for them and to share their excitement about young children's mathematical potential.

#### Key takeaways:

1. Ideas for teaching division to young children.
2. Ways to evaluate learning from a lesson.
3. Processes for trialling and polishing lessons.

### E03 USING NUMBER TALKS TO BUILD MATHS PROFICIENCY

(Focusing on the proficiencies at the heart of mathematics and numeracy learning, Unpacking high quality teaching, learning, and resources, Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Alex Box, Maths Play  
(F to Year 6)

Number talks are short (3 to 15 minute) collaborative talks that are busy transforming the maths experience for learners of all ages. They are a powerful complement to any maths program and, run regularly and strategically, can build habits of reasoning and greatly boost student confidence with numbers.

During this session, participants will explore the unique features of the classic number talk, distinguishing them from other maths talk routines that involve numbers. Special attention will be paid to the role number talks play in building mathematical proficiency. The concept of "efficiency" will be addressed as well as the importance of adapting number talks to fit particular learning contexts.

#### Key takeaways:

1. Know the difference between a classic number talk and other maths talk routines that feature numbers.
2. Understand how number talks build maths proficiency.
3. Gain knowledge and resources to develop or refine number talk practice.

### E04 AUTHENTICALLY ASSESSING STUDENT LEARNING WHEN USING CHALLENGING TASKS

(Improving assessment, through balancing formative and summative approaches)

Jane Hubbard, Monash University  
(F to Year 6)

Traditionally interpretation of student achievement has been through the use of performative based assessments that are extraneous to actual learning experiences. One of the challenges to designing assessment so that it more authentically reflects what happens in a typical mathematics classroom is utilising streamlined processes that are



## SESSION E: Friday, 11am-12pm (cont.)

transferable across contexts and topics. In this workshop, Jane will introduce an innovative approach to interpret student progress when teaching mathematics through challenging tasks, with a particular focus on monitoring student thinking as the lesson unfolds, and whole-class observational guides. Participants will have the opportunity to evaluate a series of annotated work samples to put into practice some of the key learnings from the workshop.

### Key takeaways:

1. Formative assessment practices.
2. Holistically interpreting student competence.

### E05 HOW CAN WE BUILD CONCEPTUAL CONNECTIONS THROUGH MATHEMATICAL LANGUAGE?

(Focusing on the proficiencies at the heart of mathematics and numeracy learning, Improving assessment, through balancing formative and summative approaches, Unpacking high quality teaching, learning, and resources)

**Donna McNight, Wendouree Primary School (F to Year 6)**

How do we as teachers build our student's knowledge of important mathematical vocabulary? How do we support our students to make connections while allowing them to demonstrate their thinking? This workshop will show you different ways to incorporate vocabulary into your lessons. We will also explore how to assess the student's ability to explain their thinking through the presenters adaption of the Think board which is called a Reasoning Board. We will explore how we can use a Reasoning Board as a way to collect data that will direct your future teaching. We will explore the importance of oral language and how we can use it as a form of assessment and feedback. We will look at how we can incorporate these activities across different strands of the curriculum.

### Key takeaways:

1. The importance of incorporating Mathematical vocabulary into our lessons to support the students to build connections.
2. Supporting students to demonstrate how their ideas/ strategies can lead to successful outcomes.
3. The value of both written and oral language activities that can be used as assessments.

### E06 VISIBLE THINKING ROUTINES FOR BUILDING MATHEMATICAL REASONING

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

**Ramya Deepak Kumar, Tania Hunter and Dearnne Backhouse, Mount Waverley Primary School (F to Year 6)**

Visible thinking routines provide a powerful tool for fostering student-centered mathematics instruction. By making student mathematical thinking public and encouraging engagement with one another's ideas, these routines promote a deeper understanding of mathematical concepts and reasoning skills. When students engage in sense-making, conjecturing, and justifying, they develop a deeper understanding of mathematics and are better able to apply these skills to real-world problems. By emphasizing student mathematical thinking, visible thinking routines help to create a classroom culture in which students take ownership of their learning and are more actively engaged in the learning process. Routines enable students to spend less time thinking about the \*process\* of learning so they can spend more time thinking about the \*content\* of learning. This approach to teaching mathematics helps to build more confident and competent math learners who are equipped to tackle complex problems and think critically about the world around them.

### Key takeaways:

1. The audience will learn about the benefits of visible thinking routines in math classrooms.
2. Gain an understanding of specific routines that build reasoning skills.
3. Leave with practical strategies for implementation.

### E07 FOSTERING PRODUCTIVE DISPOSITIONS IN MATHEMATICS USING EVERYDAY CLASSROOM MATERIALS.

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Bridgeen Pritchard, Catholic Education Diocese of Wollongong, NSW and Kris Westcott, Sackville St Public School, NSW (F to Year 6)**

Productive dispositions are critical for effective mathematics learning. These dispositions foster positive mindsets,

perseverance and deeper understanding of mathematical concepts. Providing students with varied opportunities to collaborate and discuss their learning is one strategy for increasing student engagement and building positive relationships with mathematics. Mathematics is fundamental for problem-solving, critical thinking, and logical reasoning in various aspects of life. When students actively engage with mathematics, they develop essential skills and gain a deeper appreciation for its real-world applications.

Often in an attempt to meet curriculum demands the importance of productive dispositions can be overlooked while attempting to teach content. This practical workshop demonstrates how everyday classroom resources can be used to promote understanding, productive dialogue and a love of mathematics while focusing on key concepts. It demonstrates the versatility of simple classroom resources for sparking creativity, perseverance and illuminating students' mathematical thinking, providing the teacher with valuable formative assessment.

### Key takeaways:

1. The importance of fostering productive dispositions in mathematics to enhance student learning and engagement in mathematics.
2. How simple everyday classroom materials are all that is required to teach effective lessons that captivate students.
3. That structuring lessons to allow productive dialogue enhances classroom culture and supports student achievement.

### E08 LAUNCH, EXPLORE, SUMMARISE- BUT HOW?

(Unpacking high quality teaching, learning, and resources)

**Renee Ladner, St Margaret Mary's and Amy Somers, Lyndale Greens Primary School (F to Year 6)**

Dive into an effective teaching and learning instructional model, Launch-Explore-Summarise, that promotes student engagement and collaboration. Students are challenged to share their knowledge, elaborate on each other's ideas and approach tasks from multiple perspectives. The session will cover various aspects, including teacher questioning techniques, appropriate wait time, task modelling, enabling and extending prompts and connections to the proficiencies

all whilst being immersed in a Challenging Task as if in the classroom yourself. This session will leave you with a renewed look on how Mathematics lessons can transform your classroom and prepare students to become numerate citizens of the world.

### Key takeaways:

1. What the Launch-Explore-Summarise model looks like in action.
2. Challenging Task resources.
3. How to write enabling/extending prompts that can be applied to a variety of tasks.

Remember: Device, paper, pens.

### E09 USING MYNOTEBOOK TO ENHANCE TEACHING.

(Unpacking high quality teaching, learning, and resources)

**Alistair Shaw (Year 7 to Year 12)**

Remote learning has encouraged many of us to rethink the way we teach our classes. MyNotebook is a free iPad app that is designed to help streamline the transition between the traditional whiteboard board and a digital platform. With this app you can write on existing documents, handwrite new notes and draw diagrams. MyNotebook has a number of built in maths objects including a Venn diagram, geometric shapes and a modifiable Cartesian plane. During this session, I will share how I have used this app as a primary teaching tool in my classroom.

### Key takeaways:

1. Use technology to enhance the teaching experience.
2. Record and share videos of lessons.

## SESSION E: Friday, 11am-12pm (cont.)

### FULL E10 EMBRACING THE NEW STUDY DESIGN CONTENT WITH TECHNOLOGY - METHODS AND SPECIALIST

(Unpacking high quality teaching, learning, and resources)

**Peideng Nie, Austin Education Pty Ltd**  
(Year 9 to Year 12)

In this session, the presenter will highlight the new aspects of Specialist Mathematics and Mathematical Methods study design for 2023. The focus will be on the questions addressing Outcome 3 marks and use of technology. A wide range of problem-solving techniques will be discussed with the participants - involving the use of TI-Nspire CAS, Casio Classpad and, if applicable, Mathematica.

All participants, upon attendance, will receive a copy of handout including the use of these technologies.

#### Key takeaways:

1. Discuss different approaches to tackle the problems and questions under exam time conditions.
2. Explore means of implementing CAS technologies to enhance procedural fluencies.
3. Develop useful and replicable resources for colleagues and students in senior math subjects.

Remember: Please bring your laptop (equipped with either TI or Casio) and copy of recent exam. Printout(s) will be provided by the presenter.

### E11 FROM MATHS TO CODE: BRIDGING THE GAP THROUGH COMPUTATIONAL SKILLS

(Unpacking high quality teaching, learning, and resources)

**Stephen Alderton, Beechworth Secondary College**  
(Year 9 to Year 12)

This presentation explores the powerful capabilities of Mathematica in real-world investigations, problem solving, and modelling tasks for VCE Mathematical Methods, and in particular the new aspects of the 2023 VCE Mathematics Study Design. It showcases technology integration, practical examples for Years 10-12, and emphasises its transformative impact in the mathematics classroom.

Demonstrations illustrate encoding algorithms and models from pseudo-code to Wolfram Syntax, unlocking new possibilities. By embracing Mathematica, educators empower students to tackle complex problems, develop critical thinking, and gain practical modelling experience. The presentation equips teachers with tools and resources for high-quality teaching and prepares students for the computational aspects of VCE Methods and beyond.

#### Key takeaways:

1. Construct high quality investigations by leveraging Mathematica to engage students in authentic investigation tasks and problem-solving experiences.
2. Transition from traditional pseudo-code to Wolfram syntax, enabling students to enhance their computational thinking skills.
3. Enhance Modelling and Visual Representation tasks through practical resources.

Remember: Attendees do not require Mathematica for this session as activities taking place will be paper-based.

### E12 MATHEMATICS AND THE MODERN CLASSROOMS PROJECT IN VICTORIA

(Unpacking high quality teaching, learning, and resources)

**Madeleine Anderson and Olivia Hopwood, Carey Baptist Grammar School**  
(Year 7 to Year 12)

Madeleine and Olivia will be showing examples of the Modern Classroom within a Year 7 and Year 11 (General Mathematics) setting. They will show methods of presenting the information (through Canvas LMS and OneNote), methods for monitoring student progress and achievement, presenting student feedback and reflections, and discussing pitfalls (including how some can be overcome) with the Modern Classrooms Project style of classrooms.

#### Key takeaways:

1. What can the Modern Classroom look like for Year 7s and 11s?
2. How can progress be monitored?
3. How can independence and student ownership of learning be enhanced through this model?

### E13 PLAYING WITH PERCENTAGES

(Unpacking high quality teaching, learning, and resources)

#### Commercial presentation

**Chris Hurst and Paula McMahon, The Mathematical Association of Western Australia (MAWA)**  
(Year 7 to Year 10)

Mathematics for Year 7 and 8 mention percentages in association with fractions, decimals and ratios. Year 7 and 8 content descriptors are underpinned by similar descriptors for Year 6. This hands-on session uses manipulative-based tasks to help build a conceptual understanding of percentages and how they are linked to other ideas. We also use tasks where the mathematics is contextualized. We contend that students need to understand percentages (the 'journey') before they can successfully use them (the 'destination'). Conceptual understanding needs to be developed rather than applying 'conversion' in a procedural and mechanical way.

#### Key takeaways:

1. Percentages are much more than a fraction with a denominator of 100.
2. Square tiles in two colours are an excellent manipulative to explore connections between fractions, decimals, and percentages.
3. Leave with two tasks to try in your classroom.

Remember: We will be looking at this product which is sold through the MAWA bookshop. <https://mathsstore.org.au/product/the-marvellous-multiplier-set/>

### E14 WORTHWHILE CAS USE IN THIS YEAR'S MATHEMATICAL METHODS EXAM 2

(Unpacking high quality teaching, learning, and resources)

**Kevin McMenamin, Mentone Grammar**  
(Year 9 to Year 12)

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 it works. 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.

#### Key takeaways:

1. Familiarisation of an approved CAS technology.
2. Applications of CAS functionality in a VCAA Examination.
3. Efficiency of approaches to solve and investigate questions thorough the use of a CAS technology.

Remember: Delegates can bring along their preferred CAS technology and a copy of the examination paper.

### E15 INTEGRATING 'MATHTASK' AS A POWERFUL PEDAGOGICAL TOOL IN SECONDARY CLASSROOMS.

(Unpacking high quality teaching, learning, and resources)

**Jiqing Sun, Deakin University**  
(Year 9 to Year 12)

In many mid-senior secondary (i.e. Year 10 – 12) classrooms, while teachers understand underlining concepts and connection amongst these concepts are important, the practical teaching might be heavily 'procedure' orientated due to the pressure brought by tight curriculum time frame and high-stake exams. Therefore more pedagogical support is needed so teachers can possibly teach beyond 'procedure' in everyday practice. 'Math Task' provides a range of mathematical problems, and many of them are exam-style questions, which can elicit deep discussions around a particular topic in mathematics curriculum. In this presentation, I will showcase how some of 'Math Task' problems can be utilised in everyday mid-senior secondary classrooms. My intention is to show how teachers can use 'Math Task' style problems as a pedagogical tool to enhance students' conceptual knowledge and its connection, so as to stretch their adaptivity to solve complex problems, which is also a necessary capacity to achieve well in high-stake exams.

#### Key takeaways:

1. Adding classroom teachers' toolbox with a range of evidence-based quality mathematics problems can be used in the classroom straight away, and the easy-to-use pedagogy around these problems.



## SESSION E: Friday, 11am-12pm (cont.)

### E16 EXPLORING MATHEMATICS THROUGH POETRY

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Tom Petsinis, Deakin University  
(Year 9 to Year 12)

The presentation will focus on my new book of poetry titled *The Python's Number*, which extends my exploration of mathematics through poetry first realised in the poetry collection *Naming the Number*. The session will entail readings from the book with a view to stimulating participants to question, discuss and comment on mathematics in all its facets - its history, protagonists, philosophy, practice and teaching. The presentation will also endeavour to encourage teachers to use poetry, and literature in general, as matrix that broadens the teaching context and raises student awareness of the cultural underpinnings of the subject. It has often been proposed that metaphors and stories are valuable pedagogical adjuncts in evoking student curiosity and interest in mathematics by illustrating that it is the product of passion and drama. This, in turn, prepares students to appreciate the more abstract nature of mathematics.

#### Key takeaways:

1. Attendees to be stimulated aesthetically and intellectually.
2. Encourage teachers to use literature as a supplementary teaching and learning tool.
3. Promote maths through poetry.

### E17 IMPROVING NUMERACY ENGAGEMENT: A CONNECTED CURRICULUM APPROACH

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Gloria Yi, St Albans Secondary College and Milton Bai, Kensington Community High School  
(Year 5 to Year 10)

Inspired by Professor Peter Sullivan's research and workshops, the connected curriculum approach in this session is designed for upper primary, junior secondary and pre-VCE VM pathway students. This session introduces this connected curriculum approach to teaching the mathematics curriculum across the 3 strands: number and algebra, measurement and geometry and statistics and probability. The approach enhances maths teaching efficiency by

covering multiple strands within the same unit and improves numeracy engagement by connecting learning activities and assessments to real life, and in particular, students' daily life. Summative assessments of the approach include the three levels of complexity: fluency, problem solving, and reasoning, which are clearly outlined in the rubric. The approach has been applied in both secondary mainstream and alternative settings in the government school sector. We proudly share our resources and welcome feedback.

#### Key takeaways:

1. Introduction to an innovative teaching approach; discussions about the approach and examples during the session; resource package will be sent to delegates after the session.

Remember: Hard copies and digital copies of handouts will both be provided. Bring a pen and/or a charged device.

### E18 THINKING DEEPLY FOR SUCCESS IN MATHEMATICS.

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Kaye Stacey, University of Melbourne  
(Year 5 to Year 10)

This session will highlight aspects of mathematical reasoning and problem solving that contribute to success in all aspects of doing and learning mathematics. Reasoning is important in learning mathematics because being able to reason about new topics (that is to understand why things are true), is a key to sense making. And the feeling that mathematics makes sense is essential for success. Experience in solving problems helps students become more flexible and confident thinkers, building independence and the ability to tackle variations to standard problems. Participants will solve problems suitable for classroom use and consider student solutions and in discussion, we will identify the reasoning demands and useful problem-solving strategies to solve the problems. We will also discuss how teachers can help students develop reasoning and problem-solving skills to support all aspects of their mathematics learning.

#### Key takeaways:

1. Students at all levels benefit from a focus on reasoning and problem solving in classrooms.
2. Improving problem solving requires experience of solving problems, reflection on solutions and knowledge of simple

strategies, all in a supportive environment.

3. Reasoning and problem solving are essential to sense making in mathematics.

### E19 MATHS AT HOME AND SCHOOL?

(Unpacking high quality teaching, learning, and resources)

Douglas Williams, Mathematics Centre  
(F to Year 10)

Maths At Home is an on-line resource developed during lockdown that has since found a home in some classrooms. The 74 activities scaffold students working independently, or younger learners working with an older helper. In school, they have developed three lives:

- As a self-directed project carried out at home, perhaps with a guide sheet from the teacher.
- As a self-directed project in school, individually or in small groups, to help differentiate learning.
- As the framework of a whole class investigation - in essence, a lesson plan created for the teacher.

We will explore one activity and become familiar with the site.

Remember: Please bring a web-connected device.

### E20 THE HIDDEN POWER OF ESTIMATION

(Unpacking high quality teaching, learning, and resources)

Michaela Epstein, Maths Teacher Circles  
(F to Year 12)

Why is estimation an essential ingredient for learning maths? And what do so many resources typically get wrong about estimation?

In this session, together we'll examine these questions and what it means for classroom practice. We'll also consider how estimation allows us to benchmark ideas, refine our intuition and hone our focus.

By uncovering great problems that use estimation, you'll have time to explore how these can act as a springboard into strengthening mathematical thinking, confidence and curiosity for all learners.

Key takeaways:

1. Understand the hidden power of estimation for mathematics learning.
2. Know what maths resources typically get wrong about estimation.
3. Get practical strategies, tools and tasks to use with all learners.

### E21 EXPLORING PLACE VALUE AND THE METRIC SYSTEM WITH MEANINGFUL RESOURCES.

Cancelled due to low numbers

(Unpacking high quality teaching, learning, and resources)

Commercial presentation

Genovieve Grouios, Australian Mathematics Central  
(Year 5 to Year 8)

Learning about number and place value is no easy feat for children. To understand the concept of number requires students to connect their knowledge of words, symbols, and concrete representations.

In this presentation participants will explore the base 10 place value system using the Linear Abacus™ to model whole numbers and decimal numbers. Teachers will learn new strategies to help students name, order, rename and expand numbers multiplicatively. The presentation will then lead to an exploration of the measurement of length where teachers will have the opportunity to see the connections between place value and the metric system through one resource. The Linear Abacus™ will be used as a measuring device to help students make sense of the standard units and processes used to name measures and convert between units.

#### Key takeaways:

1. Helping students make connections between different representations.
2. Using one resource for two strands in the Curriculum.
3. Teaching number with meaning.



## SESSION E: Friday, 11am-12pm (cont.)

### E22 I BEG TO DIFFER-ENTIATE!

(Unpacking high quality teaching, learning, and resources)

Joseph Wright, The Educational Advantage Pty Ltd  
(Year 5 to Year 10)

Differentiation is often confused with individualised work or using an online program to deliver content at the appropriate year level. While a step in the right direction, neither of these approaches captures the essence of differentiation.

At its core, differentiation is about providing activities that are rich enough to be engaged with at multiple levels. Tasks and questions that inspire and challenge a wide range of learners.

This hands-on presentation will showcase a range of low-floor high-ceiling activities designed to build mathematical skill, promote collaboration, and allow students to engage at their own level of ability.

Participants will come away from this session with some great ideas they can immediately implement in their own classroom.

This workshop will be offered on the alternate day by Andrew Lorimer-Derham.

#### Key takeaways:

1. What differentiation is about providing rich tasks that inspire and challenge a wide range of learners.
2. Why too often students are prescribed individualised content that leaves them feeling Maths is difficult to understand.
3. How presenting low-floor, high-ceiling activities that allow students to engage at their own level of ability.

### FULL E23 THE VICTORIAN CURRICULUM VERSION 2.0 FOR MATHEMATICS: FUTURE-FACING OPPORTUNITIES.

(Unpacking high quality teaching, learning, and resources)

Michael MacNeill, Victorian Curriculum and Assessment Authority  
(F to Year 10)

Michael will discuss the new opportunities presented by the Victorian Curriculum Version 2.0 for Mathematics.

#### Key takeaways:

1. An understanding of the changes and benefits of the new structure.
2. An understanding of how the proficiencies are more accessible and how that facilitates learning.
3. An understanding of how the new curriculum creates a clear line of sight in Mathematics education Victorian students, from birth through to senior secondary completion.

### FULL E24 DYSCALCULIA - UNDERSTANDING IS CRUCIAL FOR EFFECTIVE INTERVENTION!

Exploring evidence for improving student achievement (outcomes)

Catherine Epstein/Rodgers and Isabella Kottek, St Peter's East Bentleigh  
(F to Year 8)

Do you have students who have difficulty understanding seemingly simple number concepts, lack an intuitive grasp of numbers or have problems learning number facts and procedures? That was our story for a particular student in our school and before we knew it the word 'Dyscalculia' was being discussed. But what is Dyscalculia and how do you diagnose a student with Dyscalculia? Early 2022 we set out to discover this and our journey has led us to understand the unique challenges faced by these students enabling us set up effective interventions that are now helping many students who are really struggling to grasp simple number facts.

#### Key takeaways:

1. Understand what Dyscalculia is.
2. How you can screen for Dyscalculia and where you can go for professional diagnosis.

3. What interventions you can put in place to help not only students with Dyscalculia but others who are struggling with Number Sense.

### E25 A QUESTION OF SPORT - STATISTICAL AND FUNCTIONAL MODELLING

(Unpacking high quality teaching, learning, and resources)

Peter Flynn, Texas Instruments and Kara Fox, Bendigo Senior Secondary College  
(Year 11 to Year 12)

In this session, we show how sport can be used as an interesting and relevant context in the teaching and learning of VCE General Mathematics and VCE Mathematical Methods. We will use statistical and functional modelling to explore questions of interest in athletics, tennis and other sports time permitting.

#### Key takeaways:

1. The importance of technology use in statistical and functional modelling.
2. The importance of context in mathematics teaching and learning.
3. The importance of posing questions as a way of introducing statistical and mathematical concepts and techniques.

Remember: We will present with TI-Nspire Calculators. Users of other calculators are most welcome to attend.



The graphic features a central blue circle with the number '1' inside. Surrounding it are several colorful pie slices, each labeled with a fraction: 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10, and 1/11. The background is a light green gradient.

**MATHEMATICS TEACHING toolkit**

The Department of Education supports schools with evidence-based approaches for effective numeracy and mathematics teaching from birth to Level 10. The department's resources can be found in the Mathematics Teaching Toolkit.

Find out more:  
[education.vic.gov.au/mathstoolkit](https://education.vic.gov.au/mathstoolkit)

**THE EDUCATION STATE** | **VICTORIA** State Government | Department of Education

# SESSION F: Friday, 12.10pm-1.10pm

## FULL F01 PICTURE BOOKS - A SPRINGBOARD FOR EFFECTIVE MATHS TEACHING

(Improving positive dispositions for teachers and students, valuing mathematics and its applications, Unpacking high quality teaching, learning, and resources)

Sheila Griffin, Association of Independent Schools of Western Australia and Di Liddell, The Mathematical Association of Victoria  
(F to Year 4)

Picture books are a springboard for creative and critical teaching where students can make strong mathematical connections between concepts and language. Picture books contain both imagery and dialogue that can ignite curiosity and in which teachers can create purposeful and innovative learning tasks. In this workshop, we will investigate how quality picture books can lead to tasks that develop deep mathematical understandings for our students. In addition, we will look at a range of tasks that utilise the mathematical proficiencies, effective pedagogies and assessment opportunities. We will discuss thoughtful choices of picture books, considering students academic and personal requirements and the lifelong students can make on our world.

### Key takeaways:

1. Linking mathematics to literacy.
2. Highlighting how picture story book can be used to engage students into mathematical concepts.
3. Explore tasks linked to picture story books utilising the proficiencies.

## F02 INTRODUCING DIGIDIAL, PROBLEM SOLVING HANDBOOK AND HANDS-ON MATHS SERIES

(Unpacking high quality teaching, learning, and resources, Improving positive dispositions for teachers and students, valuing mathematics and its applications, Focusing on the proficiencies at the heart of mathematics and numeracy learning)

### Commercial presentation

John West, drjohnwest.com.au  
(F to Year 6)

The Digidial consists of rotating number and operations discs

that interlock magnetically, supporting a range of essential skills including counting, place value, operations, estimation and problem solving. John will also showcase the revised edition of his Problem Solving Handbook and the new Hands-on Maths series for Years 3, 4, 5 and 6. All attendees will receive a free Digidial and the Getting Started with Digidial activities booklet developed with the assistance of Dr Paul Swan.

### Key takeaways:

1. Engaging students through hands-on learning
2. Promoting a positive disposition to learning mathematics.
3. Differentiation using problem solving and reasoning tasks.

## F03 THE BALANCING ACT OF ACHIEVING WHOLE SCHOOL NUMERACY IMPROVEMENT

(Improving positive dispositions for teachers and students, valuing mathematics and its applications, Unpacking high quality teaching, learning, and resources)

Amy Somers, Lyndale Greens Primary School  
(F to Year 6)

In 2019 Lyndale Greens Primary School were one of the forty schools involved in MAV and MSTEG's two year collaborative project. Implementing school-wide change was a balancing act and a challenge however, our Numeracy leadership team effectively implemented changes that provided a big impact in our Numeracy teaching and learning. In this session, we reflect on our big take aways and share how we implemented our project to build school-wide capacity around Talk Moves. We will share our successes, challenges, and the benefits of working and learning together with our aspiring leaders throughout the project.

### Key takeaways:

1. Working together and listening to others.
2. Setting realistic goals and timelines..
3. What to do when things don't go as planned.

## F04 PROBLEM SOLVING - HOW WE TEACH AND ASSESS MATHEMATICAL PROFICIENCY

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Paul Staniscia, Southern Cross Grammar  
(F to Year 6)

Mathematical Proficiency cannot be categorised as present or absent, one needs to keep in mind that every mathematical idea can be understood in many levels and many ways (National Research Council, 2001). It is something that is acquired over time and as students move through their schooling they should become increasingly proficient. Therefore, to become proficient, students need to spend time doing mathematics (solving problems, justifying their thinking, developing understanding, practicing skills) and building connections between their previous knowledge and new knowledge.

How do we do this? Using the Mathematical Proficiency Strands, this workshop will evaluate an instructional model in teaching Problem Solving, the strategies students need, the tasks we select, how to enable and extend and how students can model their thinking. Participants will also explore how we assess the proficiency strands through whole school moderation practices and the use of rubrics for self, peer and teacher feedback.

### Key takeaways:

1. The steps students need to take in order to solve problems.
2. The strategies students use when solving problems.
3. How to support metacognition when solving problems.

## F05 SCHOOL CASE STUDY: DAILY REVIEWS - PUTTING ROSENSHINE'S PRINCIPLES INTO ACTION

### Cancelled due to low numbers

(Unpacking high quality teaching, learning, and resources, Exploring evidence for improving student achievement outcomes)

Laura Siu, Tim Hughes, Craig Turner and Chelsea Bowman, Wedge Park Primary School  
(F to Year 6)

In this presentation we will share how we have taken the latest research including Science of Maths as well as Rosenshine's

Principles and used them to inform our practises at Wedge Park Primary School. We will share the why and how of their implementation; demonstrate a Daily Review session and how we plan our sessions in order to be responsive to student needs.

### Key takeaways:

1. Ideas for implementing Daily Reviews.
2. How to implement and manage instructional practice changes.

## F06 WHAT EXACTLY IS THE SCIENCE OF MATHS?

(Exploring evidence for improving student achievement outcomes)

Ange Rogers, Numeracy Teachers Academy  
(Year 3 to Year 6)

The 'Science of Maths' is a relatively 'new' movement in the Maths Education world. It has gained much traction since interest in the 'Science of Reading' exploded. In this session Ange will explore how the 'Science of Math' ideas might be used to guide our instruction in the maths classroom. The link between practice and research will be explored and resources to help you make evidence-informed decisions will be shared. We will discuss exactly what you need to know about the 'science of maths' and why the Inquiry vs. Explicit debate has reached fever pitch. The session will most likely bring up more questions than answers, but Ange guarantees it will get you thinking!

### Key takeaways:

1. A better understanding of the science of maths movement.
2. An understanding of the latest research guiding the teaching of maths.



## SESSION F: Friday, 12.10pm-1.10pm (cont.)

### F07 ACTIVE RECALL: HOW SMALL CHANGES EQUAL BIG DIFFERENCES IN THE MATHEMATICS CLASSROOM

The presenter has cancelled this session

(Exploring evidence for improving student achievement outcomes)

Amber Marcus, St Augustine's School Wodonga (F to Year 6)

Throughout the successful completion of my Master of Evidence Based practice, I conducted extensive research into quality mathematics teaching, which enables all students to be successful learners. My research drew me to the Science of Learning. From here I discovered the PEN principles, which take into account the Psychology, Education and Neuroscience behind learning. This then led me to the need for daily active recall as opposed to passive review. Active recall is the process of retrieving previously learnt information without it being explicitly re-taught.

Recently I have been implementing daily active recall at the beginning of math lessons. This consist of five questions each based on a different concept that has previously been taught. This small but effective change in teaching has led to high levels of conceptual growth for all students, evidenced by students who love math, are highly engaged, and are demonstrating growth levels well above expectations.

#### Key takeaways:

1. Daily active recall over passive review is a must in a mathematics classroom.
2. An interleaved approach to active recall supports students conceptual growth.
3. Regular and consistent checking for understanding within a math class is vital.

### F08 "GREATEST OF ALL TIME": UNPACKING ABC EDUCATION GOAT MATHS GAMES

(Unpacking high quality teaching, learning, and resources)

James Russo and Ann Gervasoni, Monash University, Amy Nelson and Astrid Scott, ABC Education (F to Year 6)

Learning mathematics concepts and strategies is an active process that takes time. For children, learning involves

moving, touching, seeing, hearing, noticing, thinking, imagining, describing, discussing, representing, investigating and reflecting. This means that teachers need tools to create mathematics classrooms that are engaging and dynamic places for students, filled with activity and discussion about the maths that students are using and learning.

ABC Education's GOAT Maths games are an absorbing collection of teaching tools designed to help support students explore important mathematics concepts. The antics of the goats in GOAT Maths provide contexts to promote engagement, problem-solving and learning. An important feature of the GOAT Maths games is that they promote collaborative group play, allowing opportunities for student choice and strategising. The focus of this workshop will be on unpacking the various GOAT Maths games, with a view of supporting teachers to effectively use these interactive resources in their classrooms.

#### Key takeaways:

1. To be able to outline the design principles underpinning the development of the GOAT maths games suite.
- 2 To familiarise teachers with the various GOAT maths games.
3. To provide teachers with discussion and reflection prompts to support student mathematical thinking and reasoning when they are using the GOAT maths resources in their classrooms.

Remember: Participants will need access to a device.

### FULL F09 BISECTION AND NEWTON'S METHOD AND PSEUDOCODE IN MATHS METHODS.

(Unpacking high quality teaching, learning, and resources)

Trang Pham, Methodist Ladies' College (MLC) (Year 11 to Year 12)

This session is designed to assist teachers who are new or returning to Maths Methods course. The workshop will feature concepts and examples of the "Revised Areas of Study" accredited from 2023 – 2027. Among the topics covered are Bisection method, Numerical solutions of polynomial equations (Newton's method), Trapezium rule for approximating areas and Pseudocode. Participants are encouraged to bring along any resources related to the above topics to share in this workshop. Participants will have time during the session to develop some activities/notes to share and then take to use in their own classrooms.

#### Key takeaways:

1. Making the concepts more interesting, fun, easier to teach for teachers and for students to learn.
2. Increasing students' engagement and motivation of the subject.
3. Providing the teachers with a broader knowledge of the topics and gaining more self confidence in teaching these in class.

Remember: Bring your own CAS calculator handheld or emulator (either Ti-Nspire CAS or Casio ClassPad) to this workshop.

### F10 HOW'S YOUR MATHEMATICAL DIET? - BRINGING MATHS TO LIFE THROUGH INTENTIONAL FUN

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

#### Commercial presentation

Andrew Lorimer-Derham, Think Square (Year 7 to Year 8)

"The healthy food pyramid I grew up with (carbs in the 'eat most' section) has changed dramatically, yet our mathematical diets remain the same. High in fluency, low in engagement. To thrive in the age of AI, our students need a more balanced mathematical diet. One that enables them to apply their skills in novel ways, think creatively and solve interesting problems.

You're invited to sample the unique local menu from the Maths Mate Year 7-8 textbooks:

Creative entrees to whet your appetite and promote discussion at your table. Rich mains designed to satisfy a range of palettes, paired with novel challenges infused with joy. Come and see why over 2000 food critics (students) most commonly describe their experience as 'fun'.

#### Key takeaways:

1. A balanced mathematical diet should equip students to solve novel problems and think creatively.
2. Participants will come away with a range of activities that embed all of the proficiencies within the one task.

Remember: Bring your mathematical appetite!

### F11 INTRODUCTION TO KEYNESIAN PROBABILITY

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Terence Mills, Crusoe 7-10 Secondary College (Year 9 to Year 12)

The name of John Maynard Keynes (1883-1946) is usually associated with economics. "Keynesian economics" is a well-known phrase. However, as an undergraduate at King's College Cambridge, Keynes studied mathematics, not economics. Only subsequently did he study economics, privately, under the guidance of the distinguished English economist, Alfred Marshall (1842-1924). One of Keynes's early works was entitled A Treatise on Probability, published in 1921. Keynes's approach to probability will come as a shock to today's mathematics teachers. For example, Keynes did not regard all probabilities as numbers! This presentation will be an introduction to Keynes's imaginative work on probability especially in light of how mathematics is presented in Australian schools today. The presentation will contain a brief biographical sketch of Keynes, a description of Treatise, and its reception by reviewers and scholars. Reading Keynes's work has made me wonder about the meaning of probability.

#### Key takeaways:

1. Probability is complicated.
2. Probability and logic are connected parts of mathematics.
3. The stellar career of Keynes illustrates what is possible after a degree in mathematics.

### F12 EXTENSION MATHEMATICS FOR THE HIGHER ACHIEVING STUDENTS IN OUR CLASSES

(Unpacking high quality teaching, learning, and resources)

#### Commercial presentation

Ian Bull, Melbourne High School (Year 7 to Year 10)

Research indicates that about 10% of students in our classes could be classified as being Gifted and Talented/High Achieving. As educators, we can identify these students in our classes and encourage them to take on the challenge of completing tasks that require higher-order thinking.



## SESSION F: Friday, 12.10pm-1.10pm (cont.)

This encourages students to broaden their understanding by explaining their reasoning and demonstrating their knowledge on different levels. Suitable material and approaches for Year 7 through to Year 10, will be presented in this session and participants will be able to experience working through some tasks.

### Key takeaways:

1. Catering for high achieving students.
2. Use of maths extension materials.
3. Exploring metacognition and mathematics.

Remember: A pen to write with and a simple calculator, such as the one on your mobile phone will do.

### F13 TO CAS OR NOT TO CAS ... THE (EXAM) QUESTION

(Improving assessment, through balancing formative and summative approaches)

**Alastair Lupton, Adelaide Botanic High School**  
(Year 11 to Year 12)

"The VCE Maths Methods Exam 2 is 'CAS permitted', but are there times when we should put the CAS down? Maybe, like Kenny said, you have to "know when to hold 'em, know when to fold 'em"? This conversation will be had with reference to the 2022 exam, looking at places where CAS was essential, where it was an option, and where its use was problematic. Video solutions featuring discerning Classpad use will be shared.

### Key takeaways:

1. When to use CAS in Methods exams.
2. When not to use CAS in Methods exams.
3. Ways that Classpad can be used in Methods exams.

Remember: Participants can bring any kind of CAS if they want to 'play along'. Support will be offered for Classpad use. Ideally participants will be familiar with the 2022 Math. Methods Exam 2.

### F14 USING FUNCTIONS AND TABLES FOR LEARNING WITH A SCIENTIFIC CALCULATOR

(Unpacking high quality teaching, learning, and resources)

**Barry Kissane, Murdoch University, WA**  
(Year 7 to Year 10)

Functions continue to be basic mathematical constructs, or prime importance to many parts of the mathematics curriculum, particularly (but not only) Algebra. The educational value of scientific calculators derives from the experiences they offer students, not merely from their capacity to generate numerical answers, even though naïve interpretations of the word 'calculator' as a device restricted to 'calculation' continue to be widespread, especially in the early secondary school years. Following a model for the educational use of calculators, this hands-on workshop explores several ways in which the use of a calculator facility to define and use functions and to construct tables of values for them can be productively used for learning mathematics in the early secondary school years.

### Key takeaways:

1. User-defined functions are a key affordance of modern scientific calculators.
2. Tabulating functions efficiently allows them to be used productively for learning in various ways.
3. The learning potentials of scientific calculators are regularly under-appreciated and neglected when the calculators are mostly used for arithmetical calculations.

Remember: Calculators will be available for use in the session. Participants are free to bring their own scientific calculators that allow users to define functions and construct tables of values.

### F15 PRACTICAL TIPS FOR TEACHING PYTHAGORAS

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

**David Leigh-Lancaster, Leigh-Lancaster Consulting**  
(Year 7 to Year 10)

Pythagoras theorem is now introduced at Level 8 of the Victorian Curriculum Version 2 (Australian curriculum Version 9). In this session we cover familiarisation with

the corresponding curriculum content across the strands, and explore related examples, activities, applications and proficiencies for this fundamental aspect of measurement and space.

### Key takeaways:

1. Familiarisation with Pythagoras theorem at Year 8 in the revised Victorian and Australian curriculums.
2. A progression of activities, tasks and applications for teaching this content.

### FULL F16 BRINGING A SMILE TO THE MATHS CLASSROOM WITH LESSON OPENERS AND CONCRETE MATERIAL

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Vicky Kennard,**  
(Year 7 to Year 10)

Mathematics is a subject that has a reputation for being challenging, dry, and focused solely on memorisation and procedures. As mathematics educators, we know this is far from the truth, and we strive to make maths an engaging and enjoyable experience for all students. In this presentation, I will explore creative ways to enliven our teaching and make maths fun and exciting for our students and ourselves. We will discover how lesson openers can spark curiosity and encourage flexible thinking, leading to more extensive vocabulary and enhanced problem-solving skills. In addition, we will explore the power of using concrete materials and visual aids to build conceptual understanding and make abstract concepts more accessible and tangible. As an enthusiastic teacher who loves math, I am excited to share these strategies and inspire you to bring joy and creativity to your math lessons.

### Key takeaways:

1. How to use lesson openers to spark curiosity.
2. How to integrate concrete/virtual manipulatives into higher level topics.
3. How to bring a smile to your students' faces.

### F17 TACKLING 2-STEP WORDED PROBLEMS USING A 'NUMBERLESS' APPROACH

(Unpacking high quality teaching, learning, and resources)

**Antje Leigh-Lancaster, Leigh-Lancaster Consulting**  
(Year 3 to Year 8)

Numberless word problems are based on a problem-solving approach where the numbers have been removed and the text adapted to help students focus on the 'essence' of the problem.

This session will explore how teachers can use this approach to decompose a 2-step worded problem into a series of simpler statements designed to progressively reveal the mathematical relationships within the problem.

Removing the numbers enables teachers to draw students into a conversation by asking questions such as:

- What is going on in the problem? What can you picture in your mind?
- What do we know about the quantities and relationships in the problem even though there are no numbers?
- What is the question asking us to find out?

This will be a practical, hands-on workshop, where you'll have the opportunity to learn and apply the approach to several 2-step worded problems.

### Key takeaways:

1. An understanding of the numberless word problem solving approach.
2. Practical experience with applying the approach.

## SESSION F: Friday, 12.10pm-1.10pm (cont.)

### F18 LEARNER AGENCY AND ASSESSMENT

(Improving assessment, through balancing formative and summative approaches)

Larissa Raymond, The Mathematical Association of Victoria

(F to Year 10)

Noticing, growing, assessing and becoming resourceful and assessment capable maths learners.

We will deepen our collective understanding of learner agency in this session, and the translation of this into our unique math learning contexts. We will explore ways to co-create the cultural conditions for learner agency where all learners can flourish in their mathematical learning and, in partnership with young people, how we can become more discerning designers and users of assessment practices and tools.

#### Key takeaways:

1. Conceptualising learner agency as a living ecology
2. Exploring principles of co-design
3. Deeper understanding of how to support young people in being and becoming assessment capable learners in mathematics.

### F19 OUT OF FIELD MATHS TEACHERS. REALISING THE POTENTIAL

(Unpacking high quality teaching, learning, and resources, Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Leanne McMahon, Australian Mathematical Sciences Institute (AMSI)  
(Year 5 to Year 10)

This session addresses 5 areas pertaining to Out of Field (OOF) Maths teaching:

1. Questioning the stereotype: Examines the common misconceptions surrounding OOF teachers and critically evaluates the prevailing narrative.
2. Research findings: Explores the extensive research that highlights the impact of training in mathematics content and pedagogy on teacher efficacy.

3. Leveraging experience: Recognises the value of experienced teachers and their ability to adapt and excel in teaching mathematics.

4. Targeted training: Discover effective strategies and interventions to enhance the mathematical knowledge and pedagogical skills of teachers.

5. Bringing it all together: Emphasises the importance of providing ongoing support, mentorship, and professional development opportunities for OOF teachers.

#### Key takeaways:

1. Whilst Out of Field teachers of Maths may (and have) be perceived as a problem, there are completely transferable skills non-maths teachers have that can make them excellent maths teachers.
2. Improving content and pedagogical knowledge can have a huge effect and may be done quite easily.

### F20 TEACHING FOR UNDERSTANDING WITH THE MATHOMAT GEOMETRY TEMPLATE

(Unpacking high quality teaching, learning, and resources)

Commercial presentation

John Lawton, Objective Learning Materials  
(Year 3 to Year 8)

This session invites teachers to engage with Mathomat. It is a space in which participants can consider how they might use Mathomat as a creative drawing and design tool themselves, and with their students in a classroom situation. The session involves plenty of opportunity to explore and discuss, as well as for hands on activities with Mathomat. It also will include an introduction to newly developed Mathomat tools and publications. These include the improved version of the Mathomat whiteboard template, Professor Chris Tisdell's Constructor template and related videos, and the new Mathomat Activity Centre (MAC) on our website. In MAC there are many investigations and drawing ideas using Mathomat. These can be accessed at no charge and may be guided by two printed versions of Mathomat student manuals. The MAC is an ongoing project that is constantly developing and expanding, and will soon include access to the Tarquin publication series.

#### Key takeaways:

1. Form an opinion of the classroom potential for Mathomat as a hands on tool.
2. Explore the potential for the precision, and range of shape stencils and scales in Mathomat, to promote student creativity in their classrooms.
3. Investigate the new versions of Mathomat, and supporting publications.

Remember: Participants will be provided with a complimentary copy of Mathomat which can be used in the session. It is a good idea for participants to access the Mathomat Activity centre at [www.mathomat.com.au](http://www.mathomat.com.au) and to make an initial investigation of potential areas for discussion and further exploration during the session.

### F21 TEACHING ANGLE AND DEVELOPING SPATIAL REASONING

(Unpacking high quality teaching, learning, and resources)

Rebecca Seah and Marj Horne, RMIT University  
(Year 5 to Year 8)

For STEM careers, reasoning, angle and measurement are critical concepts. A key aspect in teaching for spatial reasoning is an understanding and a deep appreciation of angle concepts and their applications when navigating the world around us. The concept of angle is first introduced in the early years and gradually developed through to the senior years. This workshop will consider a sequence of activities that will help students develop a full understanding of angle and its multi-facets, its measurement and applications. Related concepts in the workshop include transformations, similarities and scale. Concrete materials and apps will be used to support learning.

#### Key takeaways:

1. The learning progression of the concept of angle measurements.
2. Using activities and resources/apps to develop angle measurement and spatial reasoning.
3. Problem solving and reasoning about angle concepts.

Remember: bring along a smart phone, pad or computer with internet access

### F22 WHAT'S IMPORTANT? MULTIPLICATIVE THINKING, THAT'S WHAT!

(Unpacking high quality teaching, learning, and resources, Exploring evidence for improving student achievement outcomes)

Commercial presentation

Chris Hurst and Paula McMahon, The Mathematical Association of Western Australia (MAWA)  
(Year 3 to Year 8)

Over 70% of the content descriptors in the curriculum for Years F - 6 underpin at least one aspect of multiplicative thinking. In addition to that, nearly 75% of the content descriptors for Years 7 - 9 do the same. This is sufficient evidence to show that multiplicative thinking is of critical importance and becomes more so as students move out the very early years of schooling. Some results from our eight years of research will be presented along with sample tasks and assessment.

#### Key takeaways:

1. Everyone teaches multiplicative thinking.
2. Sample diagnostic task will be shared with attendees.
3. Explore a few of our teaching tasks that include the teacher notes.

Remember: We will be looking at this product which is sold through the MAWA bookshop. <https://mathsstore.org.au/product/the-marvellous-multiplier-set/>

### F23 MATHEMATICS FUN-DAMENTALS FOR MIDDLE-SCHOOL

(Unpacking high quality teaching, learning, and resources)

Nadia Abdelal, EM Maths Consulting  
(Year 5 to Year 8)

Using the Concrete, Representation, and Abstract approach (CRA) in middle school, for the effective consolidation of abstract concepts. In this hands-on workshop, we will work through tasks ranging from fractions and algebra to geometry and statistics using conceptual approaches and the concrete, representational, and abstract (CRA) model. Along with this, we discuss why these approaches are far more effective for not just engagement, but mathematical retention and transfer.



# SESSION F: Friday, 12.10pm-1.10pm (cont.)

### Key takeaways:

- 1. Conceptual learning of mathematics.
- 2. Building student agency in the maths classroom.
- 3. Hands-on learning of mathematical concepts.

## F24 RESEARCH INTO PRODUCTIVE PEDAGOGICAL RELATIONSHIPS - ENHANCING YOUR RELATIONSHIPS WITH STUDENTS

(Unpacking high quality teaching, learning, and resources, Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Thomas Moore, EngageME Mathematics (Year 3 to Year 12)

Throughout the conference, you will attend various workshops, each brilliant in its own right! However, zero of these practices can reach their full potential without establishing a foundation of strong teacher-student relationships. There has been an abundance of research conducted into the importance of such relationships, but very little has uncovered how teachers build Productive Pedagogical Relationships with their students... Until NOW!

This presentation will share findings from my current PhD research that identifies how effective teachers of mathematics build Productive Pedagogical Relationships with their students. It will be a relaxed presentation that cuts through the noise and gets to the core elements of how such relationships form. It will share ideas that feel both intuitively correct and somewhat surprising, and it will be done so in a way that leaves you feeling curious to learn more. After all, connection is something that is craved by every human being!

### Key takeaways:

- 1. Reflect on how they build relationships with their students.
- 2. Explore a theoretical model that can be used to describe how interpersonal relationships form, and apply this in the context of teacher-student relationships in the mathematics class.
- 3. Explore strategies that enhance teacher-student relationships and improve student motivation, engagement and affect.

## F25 TEACHING 'FRACTIONS' USING REPRESENTATIONS APPROPRIATE TO STUDENT LEVEL OF UNDERSTANDING

(Unpacking high quality teaching, learning, and resources)

Heather McMaster, University of Sydney (F to Year 8)

Mathematics consists of abstract ideas. Representations of these ideas are needed for students to understand mathematical concepts. In teaching 'fractions', teachers need to assist children to access the mathematics through appropriate representations. In this workshop, different representations of fractions will be presented and sequenced to support learning as a student moves through the levels of the National Numeracy Progression (sub-element InF). Although relevant for teachers of all year levels up to Year 8, the focus will be on teaching fractions to students in Years 5 and 6.

### Key takeaways:

- 1. Particular representations of fractions and associated with particular meanings of 'fraction'.
- 2. Representations of 'fractions' must be carefully chosen so they connect with students' existing understandings.

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# SESSION G: Friday, 2pm-3pm

## G01 PUTTING THE PLUS IN PLANNING -COLLABORATIVELY IMPROVING STUDENT OUTCOMES

(Exploring evidence for improving student achievement outcomes)

Ruth Staniscia and Michelle Perceval, St Peter Chanel School  
(F to Year 6)

The collaborative planning approach ensures that student needs are effectively addressed while enabling teachers to articulate their own needs and enhance their professional capacity. By utilising data to inform decision-making and aligning the curriculum, instruction becomes purposeful and responsive to student needs.

During collaborative planning, educators engage in reflection to evaluate instructional impact and assess student outcomes. They analyse student learning, identify effective interventions, and share insights to drive continuous improvement.

By fostering collective teacher efficacy, planning creates an environment that promotes collaboration, mutual learning, and professional growth. It encourages open communication, the sharing of best practices, and supportive interactions among teachers.

In this workshop, participants will explore a collaborative planning approach supported by the PLC+ framework. The framework's five guiding questions will be examined, supporting teachers to identify curriculum expectations, assess student learning, effectiveness of instruction and the development of professional expertise.

### Key takeaways:

1. Gain an understanding of how Collaborative Planning allows for the meaningful use of data and curriculum design.
2. Explore how Collaborative Planning builds teacher capacity through participation in pedagogical discussions.

## FULL G02 EMPOWERING MATHEMATICAL MINDS: THE POWER OF STUDENT CONFERENCING

(Improving assessment, through balancing formative and summative approaches)

Ramya Deepak Kumar, Dearnne Backhouse and Tania Hunter, Mount Waverley Primary School

(F to Year 6)

Student conferencing in math is a powerful instructional strategy that can help support student learning and growth. While conferencing is often associated with writing, it is equally important in math, as it allows teachers to talk to students about their mathematical thinking while they work.

By engaging in these conversations, teachers can move students' thinking forward in the midst of problem-solving and support their mathematical sense-making. Effective conferencing involves asking probing questions and using visual aids to help students deepen their understanding and make connections.

Incorporating conferencing into math instruction can help support all students' learning and promote mathematical growth. It is an impactful strategy that allows teachers to connect with their students on a deeper level, understand their thought processes, and help them develop their mathematical skills.

### Key takeaways:

1. Participants will learn about the importance of student conferencing in math and gain practical strategies for effective conferencing, such as questioning techniques and visual aids.
2. They will also leave with ideas for how to incorporate conferencing into their math instruction to support all students' learning and promote mathematical growth.

## G03 MATHEMATICS ACADEMY: EMBEDDING ENRICHMENT THROUGH EXTRA CURRICULAR PROGRAMS

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Rachael Gore and Andrew Robinson, Albert Park College  
(Year 5 to Year 12)

In 2023, Albert Park College launched the inaugural Mathematics Academy. Over 30 students in years 7 to 11 enrolled. Students undertook specialised training sessions and competed against students from schools across Australia in a series of mathematics challenges. This is our story.

The Academy was established with the following aims:

- To foster a joy and love for mathematics.
- To engage students in investigations, problems, puzzles and mathematical modelling in inclusive environments that value everyone's unique contributions.
- To develop skills in group work, collaboration, discussion and peer support in a positive, engaged, and student centred classrooms.
- To make connections across mathematics and appreciate how different approaches can support learning.
- To be curious, open, and committed to learning new perspectives in mathematics that are beyond traditional curriculums.
- To develop individuals' personal identity as mathematicians who value depth of understanding, lifelong learning, and the beauty of mathematics.

### Key takeaways:

1. Understand how mathematics competitions and games can be integrated into an extra curricular program to maximise inclusivity and impact.
2. Understand how problem solving and reasoning skills can be developed using challenging questions that go beyond traditional curriculums.
3. Understand how to promote a love of mathematics across an entire school community.

Remember: Participants will need a mobile phone with an internet connection

## G04 ENGAGING = INVESTIGATIVE + EFFECTIVE

(Unpacking high quality teaching, learning, and resources)

Sarah Crook and Kelli Simmons, Lake Boga Primary School  
(Year 3 to Year 6)

This workshop will promote effective teaching of mathematics using Victorian research from Clarke, D.M, & Clarke, B.A. - '25+ Characteristics of Effective Teachers of Mathematics'. An investigative and practical hands on component will be experienced to develop understanding relationships between numbers using common resources found in a school. The experience of young people (Years 3-6) with this same investigation will be shared with tips and tricks from other Participating Teachers from PMSS. Further exploration will be to seek the presence and assessment opportunities of the mathematical proficiencies: understanding, problem solving, reasoning and fluency plus productive dispositions.

### Key takeaways:

1. Learning that matters is hands on, driven by learner curiosity and reflection.

## G05 PROBLEM SOLVING- SO MUCH MORE THAN WORDED PROBLEMS

The presenter has cancelled this session

(Unpacking high quality teaching, learning and resources)

Bernadette Long, Glowrey Primary School  
(F to Year 6)

As teachers we are constantly being told to give students lots of experiences with problem solving. Teachers try so hard to teach students how to problem solve. However many of the examples we are being shown are based around worded problems. There are many other ways for students to develop problem solving skills. In this presentation I will provide a variety of examples of ways class teachers from F to 6 can encourage students to think deeply, work collaboratively and reason their way to mathematical solutions while promoting maths as a fun subject.

### Key takeaways:

1. Mathematics classrooms need to be places where students are required to thinking deeply.

## SESSION G: Friday, 2pm-3pm (cont.)

2. It is important to use a variety of activities to develop students that are able to problem solve.

3. Problem solving is an essential life skill and maths is a wonderful vehicle to encourage these skills.

### FULL G06 THE USE OF RUBRICS WHEN ENGAGING WITH CHALLENGING MATHEMATICAL TASKS

(Exploring evidence for improving student achievement outcomes)

Alison Hall, Australian Council for Educational Research (F to Year 6)

The exploration of the planned use of challenging mathematical tasks. These tasks provide the opportunity for students to improve their mathematical thinking by working on problems that they do not yet know how to answer. This action research involved a heterogeneous class of Year Three students from a Catholic Parish Primary School in the northern suburbs of Melbourne. A rubric was also developed that was used, in conjunction with these tasks, to support discussions with students, broaden their strategies in finding solutions and thereby improve their conceptual understanding. These pedagogical approaches were found to support the improvement of both students' conceptual understanding in mathematics and teachers' reflective practice.

#### Key takeaways:

1. Presenting ideas around using challenging mathematical tasks - what to consider in selection and delivery.
2. The use of enabling band extending prompts to support and extend students.
3. Using rubrics to assess student's levels of thinking when working with these tasks.

Remember: Pen, paper and highlighters.

### G07 A CONNECTIONIST APPROACH TO DATA, FRACTIONS AND STUDENTS' LIVES

(Unpacking high quality teaching, learning, and resources)

Elise van der Jagt, University of Wollongong (Year 3 to Year 6)

Statistical literacy is increasingly recognised as vital for our students to become 'citizens in modern societies that are increasingly shaped and driven by data based arguments' (Weiland, 2017, p. 33). Conversely, fractions are sometimes seen as not relevant in today's digital world, yet they present an opportunity to engage students' multiplicative thinking and support future mathematical topics such as algebra, equations, and ratios. This workshop shows how connecting fractions with data can support the understanding of both these important topics and make them meaningful to students' lives.

The workshop activity uses a connectionist approach to bring several mathematical concepts and areas of the NSW syllabus together, mapping a Lovitt and Clarke (1988) activity to the Australian F-10 Curriculum v.9.

#### Key takeaways:

1. A connectionist approach exposes the structure of mathematical ideas, deepening students' understanding of mathematics as a discipline.
2. Constructing data displays and transforming one into another improves statistical literacy.
3. Collecting and displaying personally meaningful data improves students' engagement and creates student 'buy in'.

### G08 MULTI-SENSORY MATHS - EFFECTIVE INSTRUCTION CATERING FOR LEARNING DIFFERENCES

(Unpacking high quality teaching, learning, and resources)

Esther White and Nicole Caddaye, Maths Australia (F to Year 6)

#### Commercial presentation

In this interactive presentation, you will gain an understanding of a range of teaching models that incorporate research and evidence based recommendations for numeracy intervention. You will explore how two hands-on manipulatives and a

sequential, mastery-based ICRAVE\* methodology (intuitive - concrete - representational - abstract - verbal - explicit) that enable a smooth progression from whole numbers to fractions, decimals, percent's and algebra. Engage and understand the simple language of maths as we physically build a progression of mathematics learning.

#### Key takeaways:

1. Student stages of development and why multi-sensory maths instruction is so critical
2. How to integrate Response To Intervention, Rosenshine's Principles of Instruction, Explicit Direct Instruction, Cognitive Load Theory, Science of Maths and CRA methodology
3. The ease within an elegant manipulative that progresses alongside understanding.

Remember It is recommended that delegates bring coloured pencils, pen and paper as well as any manipulatives they currently use for teaching whole number operations, time, fractions, decimals, percent's or algebra This will be interactive and highly informative and practical, though based on research and evidence- based practice.

### G09 NETWORKS BY MAFFSGURU AND NELSON VICMATHS - VCE GENERAL

(Exploring evidence for improving student achievement outcomes)

Darren Smyth, Melbourne Grammar School and Robert Yen, Cengage (Year 11 to Year 12)

MaffsGuru's Darren Smyth and VICmaths' Robert Yen unpack some past General Maths VCE questions on Networks. Hear some expert advice on reading and interpreting the questions, the allocation of marks, the common areas and errors, and the student performance for those questions. Learn some teaching tips and exam hacks for this topic.

#### Key takeaways:

1. Examining some past General Maths VCE questions on Networks.
2. Some expert advice on reading and interpreting the questions, the allocation of marks, the common areas and errors, and the student performance for those questions.
3. Learn some teaching tips and exam hacks for this topic.

### G10 HOW CAN STUDENTS PROVE MULTIPLICATION?

Cancelled due to low numbers

(Unpacking high quality teaching, learning, and resources)

Karim Noura, Melbourne Polytechnic (Year 7 to Year 12)

Playing with numbers gives me a certain feeling of enjoyment. I had just finished multiplying two numbers when one of my friends challenged me with a question: "How can you prove that your answer of multiplying two numbers is correct?" This got me thinking, searching for an answer to this question. In this presentation, I have some ideas and methods about multiplications and proof of multiplications which I believe will support students learning and dealing with numbers.

#### Key takeaways:

1. Exploring various methods of multiplying numbers.
2. Exploring different ways of proving the answer of multiplying two numbers.
3. Encouraging Maths students to think out of the box when dealing with Mathematical problems.

Remember: Pen, paper and basic calculator.

### G11 USING MATHEMATICS FOR RANDOM QUESTIONS.

(Unpacking high quality teaching, learning, and resources)

Peter Fox, Texas Instruments Australia (Year 9 to Year 12)

While it would be fair to say the content of this workshop is not exactly random, it's probably not what you would expect. To help understand the journey this workshop will take you on, here's a sample problem: "Imagine you've just ordered an Uber™, while you're waiting for it to arrive you amuse yourself by tossing one of those old-fashioned currency items (a coin). If a tail appears you take a step to the right, if the king's head appears, you take a step to the left. How far from your Uber pick up point will you be when your Uber arrives? Questions like this and more, will be explored through simulations, simple coding and robotics.

## SESSION G: Friday, 2pm-3pm (cont.)

### Key takeaways:

1. How does the tax department know you randomly generated your tax deductions?
2. How do seemingly random foraging movements of ants result in straight lines?
3. How can we teach concepts over formulas?

### G12 VALUING MATHEMATICS THROUGH FINANCIAL LITERACY: FREE RESOURCES AND GAMES

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

#### Commercial presentation

**Damian Nicholson, Financial Basics Foundation (Year 7 to Year 12)**

Financial Basics Foundation (FBF) provides free of charge to all Australian educators extensive resources and services designed to support students in developing financial life skills.

FBF launched its revamped website this year, featuring updated financial literacy teaching and learning resources, activities and games. In addition, we have also launched the Financial Basics Academy – an e-learning portal featuring engaging online short courses with financial literacy micro-credentials.

This session will focus on free tools for student engagement with, and understanding of, mathematics in the ‘real-life’ context of personal finance. It will also showcase the updated ESSI Money Game and FBF website. ESSI Money is an interactive online game delivered in an innovative app-based environment. When playing, students practice a wide range of real-life earning, saving, spending and investing and experience the financial consequences in a safe, fun and challenging way.

All FBF resources are free and mapped to the Australian Curriculum.

### Key takeaways:

1. Free resources you can use to engage students with maths in the context of personal finance in your very next lesson.

Remember: Participants will get the most out of this session if they create a free teacher account at [www.financialbasics.org.au](http://www.financialbasics.org.au) before the session

### G13 PERFECT NUMBERS, CONTINUED FRACTIONS, FERMI PROBLEMS AND MORE.

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Stephen Broderick, St Ursula's College, Toowoomba, QLD (Year 7 to Year 10)**

This session aims to utilise scientific and graphical calculators as powerful tools to investigate mathematical concepts like rational, irrational, deficient, abundant, and perfect numbers. Through the use of continued fractions, Euclid's algorithm, and summation notation tools available on calculators, students in years 7 to 10 can engage in hands-on activities that foster problem-solving skills and gradually introduce algebraic concepts. Additionally, the proposal includes exploring Fermi problems, which further enhance critical thinking and real-world application of mathematical principles. By integrating these activities, students will develop a deeper understanding of numbers and their properties while building a strong foundation for future mathematical studies.

### Key takeaways:

1. Practical application and a richer understanding of mathematical concepts such as rational and irrational.
2. Enhanced problem-solving skills and tools.
3. A deeper understanding of number patterns and relationships.

Remember: Participants will need a scientific calculator or a graphical calculator. Participants with TI-Nspire calculators can receive the files at the session.

### G14 ACTIVATING MATHEMATICAL THINKING THROUGH PEER ASSESSMENT

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Ursula Parker and Geoffrey Menon, Camberwell High School (Year 7 to Year 12)**

Activating students to take greater ownership of their learning is paramount for success in mathematics. At Camberwell High School we have been investigating different models of peer assessment in order to promote student thinking and provide regular and timely feedback. In this session we will share strategies that we have used and found to be affective and discuss the advantages and disadvantages of each. We have found that scaffolding opportunities for students to talk about mathematics in an authentic situation develops student capacity to examine work critically and adjust their thinking accordingly.

### Key takeaways:

1. You will take away several different models for peer assessment and how to use these in the classroom without unduly increasing teacher workload.

### FULL G15 DEVELOPING STUDENT CAPABILITIES IN MATHEMATICAL METHODS

(Unpacking high quality teaching, learning, and resources)

**Zoe Schaffner and Hishaam Ibrahim, Brighton Grammar School (Year 9 to Year 12)**

At our school, we have worked as a team to develop shared, consistent, and quality resources to maximise engagement and learning success for our students undertaking VCE Mathematical Methods. Our course structure and overall curriculum delivery, which can be linked to Rosenshine's Principles of Instruction, incorporates and uses explicit teaching, effective starters, retrieval practice and regular formative assessments to promote fluency, independent learning and well-being. In this presentation, we will share teaching and learning structures including practices and routines we use as part of our overarching instructional model. These include providing students with multiple opportunities to routinely practice mastery of core knowledge, build fluency and develop the use of their CAS calculators to promote

independent thinking and problem-solving skills. In addition to providing a reflection on teaching this content heavy subject, we aim to unpack evidence-based instructional strategies and pedagogical approaches we have used to maximise learning.

### Key takeaways:

1. Effective use of shared, consistent and quality resources.
2. Using evidence based instructional strategies.
3. Maximising success through consistent learning routines.

### FULL G16 THREE WAYS WITH QUADRATICS

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

**David Leigh-Lancaster, Leigh-Lancaster Consulting (Year 7 to Year 12)**

In this session we will cover a progression of key concepts, skills and processes related to quadratics across years 7 – 10 and show how these can be developed using a combination of numerical, graphical and algebraic approaches. This will include examples of computational thinking using quadratic functions and the application of quadratics in modelling contexts.

### Key takeaways:

1. A progression of key concepts, skills and processes related to quadratics across years 7 – 10.
2. Examples of computational thinking with quadratics.
3. An integrated presentation of numerical, graphical and algebraic aspects of quadratics and modelling with these functions

Remember: Participants should bring along a device with access to a graphing/CAS application (e.g. Desmos, Wolfram Alpha) or a CAS calculator.



## SESSION G: Friday, 2pm-3pm (cont.)

### G17 MATHS ON A MAT WITH MATT

(Unpacking high quality teaching, learning, and resources, Improving assessment, through balancing formative and summative approaches, Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Matt Skoss, Centralian Senior College, NT  
(Year 1 to Year 12)**

This session is a hands-on exposure to a double-sided mat on a large tarpaulin:

- 10 x 5 grid
- Sorting Network

The Maths Mat will be used to model a range of mathematical tasks, from Early Childhood to Year 10:

- children to construct their own mathematical concepts
- kinaesthetic learning styles to be catered for
- multiple representations of ideas
- cooperative learning in a risk-taking atmosphere

The Sorting Network models the sorting of data that is done millions of times every second around the world, presented in a way that allows students to compare whole numbers, fractions, decimals and many other attributes such as height, birth date, etc.

#### Key takeaways:

1. Some memorable approaches to teach and assess a wide range of mathematical concepts.
2. Photos to share with colleagues back at school.
3. An idea on how to make both mats back at school.

### G18 PUTTING EDUCATION EVIDENCE TO WORK IN MATHS TEACHING

(Exploring evidence for improving student achievement outcomes)

**Michael Rosenbrock, Evidence for Learning  
(Year 3 to Year 12)**

Evidence-informed mathematics teaching is about using limited time and resources well, by focusing on what is most likely to have a positive impact for students. This session will

connect mathematics classroom teachers and leaders with the best available education evidence to support student learning in mathematics. The recommendations from Evidence for Learning's guidance on mathematics and metacognition will be unpacked and linked to the Victorian Curriculum and VCE. Participants will have the opportunity to engage with the research evidence, access practical tools to support planning and classroom teaching, and hear examples of how educators have put this evidence into practice. Evidence for Learning is an independent, not-for-profit organisation committed to ensuring all children throughout Australia make the best possible learning progress - all resources shared are freely available from the E4L website. This interactive and practical session is a must for anyone looking to use evidence to improve student outcomes.

#### Key takeaways:

1. What the best available evidence indicates is most likely to improve student outcomes in mathematics.
2. How to put that evidence into action in planning and teaching mathematics.

### G19 THE MATHS METRO: STRONGER CONCEPTUAL CONNECTIONS

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**David Innes, Consultant  
(Year 5 to Year 12)**

Mathematical skill sets can be analogous to laying down a Metro system in a major metropolitan city. The more connections between branches of understanding, the quicker and more effective our journeys to arrive at conclusions can be. In essence, we want to move from "stopping all stations" to "express" to solve bigger problems. David will be exploring the many different ways to solve problems of different age groups in order to avoid "only one way to solve" routes, or ones involving many steps. This session is particularly useful for those who are new to mathematics teaching, or would like non-textbook approaches to solving problems.

#### Key takeaways:

1. 9 out of 10 problems can be solved with a diagram.
2. Laborious numeracy does not equate to good mathematics.
3. The way you were taught may not be the best way all the time.

Remember: Paper and pen.

### G20 ENGAGING WAYS TO PROMOTE GEOMETRIC THINKING IN THE PRIMARY YEARS

(Unpacking high quality teaching, learning, and resources)

**Jessica Kurzman, St. Patrick's Primary School and Liz Stoward, Our Lady of the Way  
(F to Year 6)**

Students need multiple and varied rich experiences with multiple, varied representations of two-dimensional shapes in order to develop deep understandings and progress through the levels in the van Hiele Model of Geometric Thought. They need to be encouraged to investigate connections between shapes and discuss reasoning from the early years. Teachers at the primary level need to provide rich, open-ended tasks that encourage play and allow all children to investigate two-dimensional shapes in a safe, fun and enriching environment.

This workshop will provide opportunities to explore learning experiences that can promote geometric thinking in a fun and engaging way. The session will be hands-on and participants will be encouraged to engage in activities that can help their students develop deep understandings related to two-dimensional shapes.

#### Key takeaways:

1. Understanding of the progression of learning related to two-dimensional shapes.
2. Developed understanding of fun and engaging activities that can be used in the classroom to promote learning and engagement related to two-dimensional shapes.

### G21 CREATING OPPORTUNITIES FOR STUDENT SELF-REFLECTION IN THE MATHS CLASSROOM

(Improving assessment, through balancing formative and summative approaches)

**Melissa Wood, Sarah Brooks and Amanda Black,  
Camperdown College  
(Year 5 to Year 10)**

We would like to share our journey and the tools that we have used and developed to provide opportunities for our students to reflect on their mathematics learning. This includes how we use capacity matrices, bump up walls, tests without providing

a score or grade, and the important role of post assessment reflection tasks that enable students to identify their own strengths and next steps. These tools are used successfully with students to differentiate learning for our mixed ability maths classes. By improving the engagement of students in their learning we have also achieved improved student learning outcomes across year 7-10.

#### Key takeaways:

1. The important role of student reflection in the maths classroom.
2. What a capacity matrix is, and how it is used throughout a learning cycle.
3. How these tools are used to cater for a range of abilities.

### G22 SIMPLE TOOLS FOR DEEP THINKING

(Unpacking high quality teaching, learning, and resources)

**Michaela Epstein, Maths Teacher Circles  
(F to Year 12)**

How might simple tools unlock deeper and more insightful mathematical thinking?

From early learners to research mathematicians, maths can be highly rewarding - yet extraordinarily tough. Instead of embracing challenge, too often, this is something that turns learners off.

But, what if we could change that?

In this session, together we'll examine effective strategies for making mathematical problem solving less daunting and far more accessible for learners of all ages. You'll explore carefully-designed tools that your students can use with confidence and success to step into new and challenging territory.

#### Key takeaways:

1. Know how certain tools can help students become stronger and more confident mathematical thinkers.
2. Understand how and when to use mathematical tools for supporting learning.
3. Get practical strategies, tools and techniques to use with all learners.

# SESSION G: Friday, 2pm-3pm (cont.)

## G23 PROFICIENCY AND MATHEMATICAL MODELLING IN THE AUSTRALIAN CURRICULUM: MATHEMATICS

The presenter has cancelled this session

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Rachael Whitney-Smith, Australian Curriculum, Assessment and Reporting Authority (Year 3 to Year 10)

The revised Australian Curriculum: Mathematics includes new explicit content aimed at developing students' knowledge and application of the mathematical processes of mathematical modelling.

This workshop will explore the development of the mathematical modelling process as it builds in sophistication across the year levels. The mathematical modelling process draws on students' proficiency in mathematics to formulate, analyse, solve, interpret, generalise and communicate results in response to a real-world situation. Mathematical modelling is an essential dimension of the contemporary discipline of mathematics and is key to informed and participating citizenship. Students develop an understanding of mathematical modelling when they use mathematics to gain insight into and make predictions about real-world phenomena.

### Key takeaways:

1. This workshop will provide participants with a deeper understanding of the mathematical modelling process in terms of Prep - Year 10 in the Australian Curriculum: Mathematics Version 9.0, and how mathematical modelling tasks can connect all three-dimensions for the Australian Curriculum to the learning area of mathematics.

## G24 YOU NEED A TASK LIBRARY

(Unpacking high quality teaching, learning, and resources)

Douglas Williams, Mathematics Centre (Year 3 to Year 10)

Problem solving is recognised and valued in the curriculum and we are good at modelling it. But when do the students choose their own problems? When learning to work like a reader, modelling how to do it by reading to learners isn't enough. They also need to choose and explore their own

texts. That's the purpose of a book library. When learning to work like a mathematician one equivalent is a hands-on problem solving Task Library. In this session I will introduce you to my sample library in the same way I would with a class. Explore the resource. Consider the teaching craft.

## G25 NUMERO - PERFECT FOR BASIC FACTS, PROBLEM SOLVING, REASONING, FLUENCY!

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

### Commercial presentation

Julie Richards, Independent Education & Training Pty Ltd (IETPL) (F to Year 10)

Join this very hands-on workshop to see what Numero can do for your students! Learn to play the game as well as teach it. You will be introduced to all aspects of the game to ensure you leave this session with the tools to introduce Numero to your classroom.

Numero is a mental maths resource suitable for all years of primary and secondary education. It can play an important role in developing all the proficiencies at the heart of mathematics and numeracy learning, particularly problem solving, reasoning and fluency. Numero is ideal for introducing and reinforcing both simple and complex maths concepts, allowing for true differentiation for your students, within a game situation.

Julie is the Numero specialist and her passion for this game is contagious! See how learning and teaching maths can be fun!

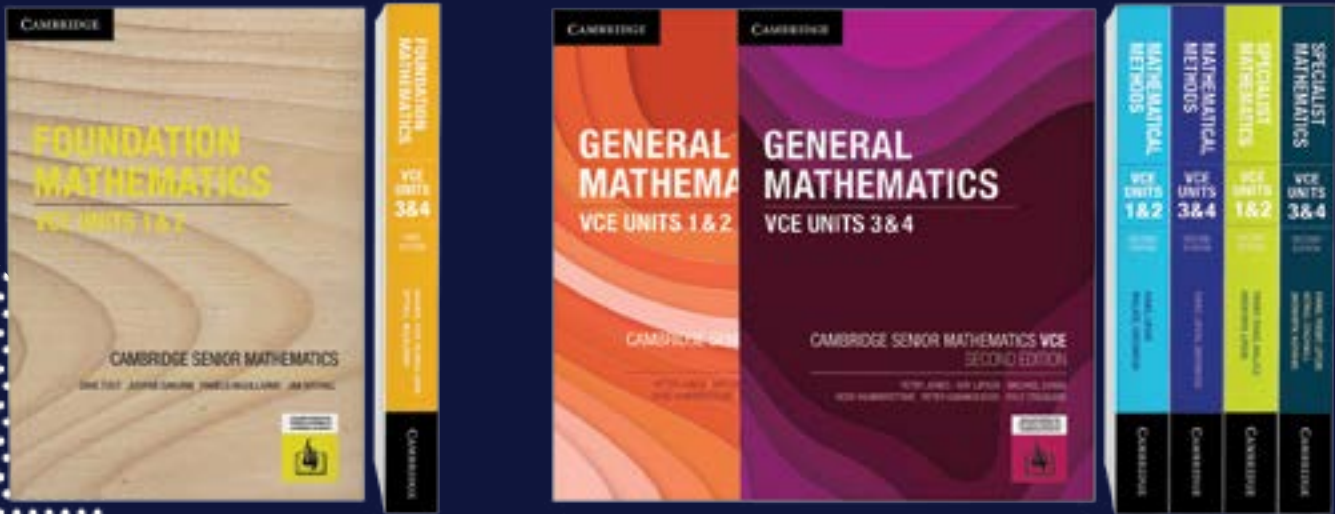
### Key takeaways:

1. A maths tool suitable for all abilities and age groups.
2. Understanding how Numero can improve all those key proficiencies in mathematics.
3. Having a product that will capture and engage student interest in developing their math skills.

Remember: An open mind, willingness to learn and a positive attitude.

# VICTORIA'S MOST TRUSTED 7-12 RESOURCES

## CAMBRIDGE SENIOR MATHEMATICS VCE



## ESSENTIAL MATHEMATICS FOR THE VICTORIAN CURRICULUM 7-10

NEW EDITION  
COMING IN  
2024



# SESSION H: Friday, 3.10pm-4.10pm

## H01 HAPPY NUMBERS: AN ENJOYABLE NUMBER INVESTIGATION!

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Peter Sanders,  
(Year 5 to Year 6)

Happy numbers is a fun and engaging upper primary number investigation that utilises square numbers, and helps develop a positive disposition towards mathematics teaching and learning. The session builds upon an earlier presentation at this conference by Ray Peck in 2003 entitled, "Are your students 'happy', 'perfect' or 'amicable'?", and includes ideas from subsequent investigations the presenter has undertaken on happy numbers with upper primary and tertiary students.

Happy numbers were invented, apparently, by a young girl playing with numbers. They provide an excellent stimulus for a number investigation as they occur (about 1 in 7 numbers are happy) frequently enough for success and excitement to happen, but not too frequently, so productive struggle is required. The investigation leads to 'sad' numbers being uncovered and hence defined and the exploration of number patterns. The latter stages of the investigation link mathematics with literacy.

### Key takeaways:

1. You will take away a fun and engaging upper primary number investigation that will help create a positive disposition towards mathematics amongst your students.

Remember: Pen and paper and a willingness to take part in a collaborative number investigation is all that's required!

## H02 INTRODUCING THE MOST VERSATILE MATHS MANIPULATIVE: THE REKENREK!

The presenter has cancelled this session

(Unpacking high quality teaching, learning, and resources, Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Commercial presentation

Amy How, Rekenrek101/ Amy How Limited  
(F to Year 4)

Have you heard about this versatile, visual, concrete manipulative? Perhaps you are curious... or even skeptical? If you are interested in encouraging mathematical talk,

reasoning, deeper understanding and daily practice in a hands on visual method, then this session is for you. You truly have to see it to believe it. This is your chance to have a go at a few hands-on tasks. You will be amazed at how this tool can be the mess-free answer for children developing deeper understanding of number sense while naturally engaging in rich mathematical talk. Join in on this introductory rekenrek workshop and hopefully you too will be singing the praises of this simple tool.

### Key takeaways:

1. Seeing the power of using manipulatives to teach greater mathematical understanding.
2. Encouraging mathematical talk and reasoning in our youngest mathematicians.
3. Gain ideas for simple, mess-free activities.

Remember: Mobile phone to access the free app.

## FULL H03 BUT WHERE IS THE EXPLICIT TEACHING IN RICH TASKS?

(Unpacking high quality teaching, learning, and resources)

Marissa Cashmore, Motivating all Maths Learners to Succeed  
(F to Year 6)

As an advocate for rich, open ended primary maths teaching, and a leader in maths education, we are constantly faced with the following comments and question:

"Where is the explicit teaching?"

I'm sure, as you have tried to implement Rich Tasks, that you may be battling with these questions in your own head and this may be the reason you avoid inquiry based maths learning.

This workshop will demonstrate and help you better understand what explicit teaching actually is, the misconceptions and the benefits of using rich, authentic mathematics in your teaching.

### Key takeaways:

1. Strategies for effectively teaching with rich mathematical tasks.
2. How to identify explicit teaching moments.
3. Task ideas to use in your classrooms.

## H04 DEVELOPING A WHOLE SCHOOL APPROACH TO MENTAL COMPUTATION

(Exploring evidence for improving student achievement outcomes)

Ange Rogers, Simply Maths Professional Development (F to Year 6)

Up to 80% of the calculations adults complete require mental rather than written computation (Reys et al., 2009). The importance of helping students to develop these skills in primary school is clear. This session explores the logistics of developing a whole school approach to the teaching and learning of mental computation. Practical examples will be shared to suggest ways these skills can become embedded in classroom practice. We will share the research-informed, systematic and targeted way we approach the teaching and learning of mental computation. You will walk away from this session with games, insights and ideas to take the first steps towards implementing a whole school approach in your own context.

### Key takeaways:

1. The importance of developing mental computation skills.
2. The importance of a whole school approach to mental computation.
3. Practical tips for running embedding mental computation in your school.

## H05 USING ASSESSMENT TO DEVELOP A DEEPER UNDERSTANDING OF FRACTIONS.

(Improving assessment, through balancing formative and summative approaches)

Michael Nelson, Moriac Primary School  
(Year 3 to Year 6)

How do we know when students truly 'understand' fractions? This presentation will allow teachers to use high-quality, evidenced-based assessments to ensure their students have a deep understanding of fractions, from the key concepts all the way to using fractions in calculations. This session will explore what kind of understanding students need to be comfortable with fractions and how to identify whether they have this understanding. Teachers and educators will leave this session with the confidence to create, implement and analyse student understanding using a wide range of tasks.

### Key takeaways:

1. Develop a deeper understanding of fractions.
2. Understand what to look for when assessing student's understanding of fractions.
3. Improve your ability to create assessment tasks that will give you the information you need.

## H06 FRACTURED FRACTIONS AND FRACTIOUS FRACTALS: VOCABULARY WITHIN AND BEYOND MATHEMATICS

The presenter has cancelled this session

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Karen Rogers, Primary English Teaching Association Australia (PETAA)  
(F to Year 6)

Fractal, fraction, fractious, fracture - what do these words have in common? How can knowing the connection between these words grow our vocabulary and support understanding across all areas of learning?

"Language is a pivotal component of mathematics success and a student's general knowledge of mathematical vocabulary can predict mathematical performance" (Riccomini et al., 2015). While the need for language understanding is clear, what is less obvious is the best way to build student vocabularies that enable them to develop mathematical understanding, fluency, problem-solving and reasoning. This session will explore words in a fun, engaging and authentic way. It will offer practical strategies for identifying the types of words to teach, for seeing the links to other learning areas and for explicitly teaching words required for mathematical proficiency.

### Key takeaways:

1. Tiered vocabulary supports teachers to identify words to explicitly teach.
2. Understanding word morphology helps with making meaning.
3. Playing with words and language can be fun!



# SESSION H: Friday, 3.10pm-4.10pm (cont.)

## H07 TEACHING FRACTIONS IN THE PRIMARY CURRICULUM – WHAT'S NEW!

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

**James Burnett, ORIGO Education and Calvin Irons, Mathema Foundation and ORIGO Education (Year 1 to Year 6)**

ACARA has increased the focus on fractions in the primary years of the Australian Curriculum: Mathematics 9.0 (ACM). This has meant that other topics (not previously included in the curriculum) appear now as necessary pre-requisites in the primary grades. For example, to be completely confident with finding equivalent fractions students will learn techniques involving HCF, LCM, and divisibility rules. This is important due to the inclusion of fractions with unrelated denominators in primary years. This session will describe the changes and how they can be taught with meaning using concrete and visual materials.

### Key takeaways:

1. An understanding of the reasons why more emphasis has been given to teaching fractions.
2. Techniques to teach greater understanding using any of the 4 fundamental models for fractions.
3. Activities that will help teach equivalent fractions involving any combination of whole number denominators.

## H08 CHALLENGING TASKS IN MATHEMATICS: THE EXPERIENCE OF BRISBANE CATHOLIC EDUCATION

(Unpacking high quality teaching, learning, and resources)

**Carly Millichap and Alana Bandholz, Brisbane Catholic Education (F to Year 6)**

In 2023, Brisbane Catholic Education schools have embarked on a professional learning journey focused on implementing Challenging Tasks in primary Mathematics classrooms. By partnering with Dr James Russo and Jane Hubbard, schools have developed their understanding of structured inquiry centred around challenging tasks. In this session, we will share stories of success where the impact has been greatest, and future steps scaling this work across Brisbane Catholic Education schools. Teachers will

leave with an understanding of using Challenging Tasks in their Mathematics classroom, as well as how these can be leveraged to build an engaging approach to Maths in a primary school.

### Key takeaways:

1. An understanding of Challenging Tasks (structured inquiry in Mathematics).
2. Challenges teachers and schools faced during the project and how these were overcome. Teacher and student stories of success will be shared illustrating the impact of this work.
3. Ways to implement Challenging Tasks as a whole-school approach.

## H09 FOCUSING ON PARABOLAS

(Unpacking high quality teaching, learning, and resources)

### Commercial presentation

**Peter Fox, Texas Instruments (Year 7 to Year 12)**

There is so much more to this wonderful curve than factorising and expanding the algebraic representation. Paper folding, applications and modelling are just some of the elements that will be touched on in this workshop.

### Key takeaways:

1. How many quadratic equations are factorised outside the mathematics classroom?
2. What do students really understand about parabolas?
3. Do light or sound experience interference at the focal point?

## H10 USING NON-EXAMPLES TO BOOST STUDENTS' MATHS ACHIEVEMENT

(Unpacking high quality teaching, learning, and resources)

### Commercial presentation

**Kathy Lin, Edrolo (Year 7 to Year 8)**

This session aims to equip maths teachers with the skills and knowledge to effectively use non-examples as a teaching strategy in their classrooms. Non-examples are examples of what something is not, and they are an effective tool for developing a deeper understanding of mathematical concepts.

During the session, Kathy will explore the benefits of using non-examples, look at different types of non-examples (including misconceptions), and examine how to integrate them into lessons to help students understand and apply mathematical concepts.

### Key takeaways:

1. Understanding of the role of non-examples in teaching Maths.
2. Identifying, creating and integrating non-examples.
3. Understanding how non-examples (as a numeracy strategy) can help cater for mixed abilities within a class

Remember: This session is targeted at junior secondary maths teachers, and is open to all teachers. Teachers do not need to be using Edrolo to get practical, ready-to-go ideas and resources for their maths classes.

## H11 AUTOGRAPH GRAPHING PROGRAM REVISITED

### Cancelled due to low numbers

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Neale Woods (Year 9 to Year 12)**

Autograph has been a popular graphing program for schools for many years. The original program had three components: 1D Statistics, 2D Graphs and 3D Graphs. Autograph is now accessible online at no cost for teachers and students.

Version 5 includes a fourth Complex Numbers component for graphing on an argand diagram. In this presentation, participants will be shown how to work in each of the four components.

### Key takeaways:

1. Use of Autograph for statistical analysis.
2. 2D and 3D graphing options using Autograph.
3. Using Autograph for graphing complex numbers and regions on an argand diagram.

Remember: Participants are encouraged to bring a laptop to the session with Autograph installed.

## H12 UNLEASHING CREATIVITY: INTEGRATING MATH AND ART WITH DESMOS

(Unpacking high quality teaching, learning, and resources, Improving positive dispositions for teachers and students, valuing mathematics and its applications)

**Nery Soto and Laura McClure, Wheelers Hill Secondary College**

(Year 7 to Year 12)

In this presentation, we will explore the intersection of math, art, and technology using the DESMOS app. Students learn how to use this powerful graphing tool to create visually appealing and mathematically meaningful art, from mesmerizing patterns to beautiful fractals. We'll delve into the underlying math concepts that make these creations possible, including geometry, trigonometry, and calculus. Moreover, students have the opportunity to be part of a supportive community of like-minded individuals who share a passion for math and art, where they can collaborate, share ideas, and learn from each other. By the end of the presentation, attendees will be inspired to integrate DESMOS into their own classrooms and explore the endless possibilities of math and art.

### Key takeaways:

1. Learn to integrate DESMOS for visually stunning and mathematically meaningful graphs.
2. Gain insight into math concepts underlying artistic creations.
3. Be inspired to create cross-curricular projects combining

## SESSION H: Friday, 3.10pm-4.10pm (cont.)

math, art, and technology to engage students in a fun and creative way.

Remember: To join this presentation, participants will need a device with internet access and DESMOS installed. DESMOS is available for free online and as an app on iOS and Android devices. Participants are encouraged to have a stable internet connection and a device with a large enough screen to view and interact with the app comfortably. While the presentation primarily focuses on using DESMOS, other graphing calculators or software can be used as an alternative. Participants can bring any device they feel comfortable using, and we will provide support throughout the session to ensure a smooth experience.

### H13 GEOMETRY - DOT TO DOT DRAWINGS AND BEYOND

#### Cancelled due to low numbers

(Unpacking high quality teaching, learning, and resources)

Robert Money and John Widmer  
(Year 6 to Year 10)

What started as idle scribbles and graphical puzzles has, in the last one hundred years, produced more change in geometry than the previous two millennia. A 'graphs and networks' component for Years 6 to 10 curriculum will be outlined and there will be plenty of time to join the curriculum argument between traditional geometry and 'graphs and networks'. If we don't argue for long then a few of the problems presented should engage your attention.

#### Key takeaways:

1. Teachers will obtain an overview of the 'graphs and networks' curriculum.
2. Problems appropriate to different year levels will be provided.

3. Teachers can discuss which topics in geometry should be included in their curriculum

### FULL H14 FOUNDATION MATHEMATICS: INVESTIGATIONS TO ENGAGE AND EMPOWER STUDENTS.

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Marilyn Hand  
(Year 11 to Year 12)

What I love about the new Foundation Mathematics curriculum is that it can enable student growth. By starting with Investigations to pique the students' interests, we can create opportunities to engage students with the maths that is relevant to them. We can then extend their mathematical skills and knowledge so that they can apply their mathematical thinking to unknown situations.

Embedding the Problem-Solving cycle into every Investigation can facilitate the development of students' analytical thinking. In this workshop we will examine how students can recognise mathematical situations in order to make decisions about the appropriate mathematical tools and processes, and to apply these in contexts that are beyond their direct experiences.

We will consider ways to empower students to use their mathematical skills and knowledge with confidence - to metaphorically fold them up, put them in their back pockets, and take them out into the real world.

#### Key takeaways:

1. Create relevant Investigations for students.
2. Map Investigations to the Foundation Mathematics curriculum.
3. Share with other workshop participants to build a bank of resources.

### FULL H15 THE MATHEMATICS OF ARTIFICIAL INTELLIGENCE FOR YEARS 9-12

(Improving positive dispositions for teachers and students, valuing mathematics and its applications)

Georgia Gouros, CHES School - Centre for Higher Education Studies  
(Year 9 to Year 12)

Mathematics of Artificial Intelligence Years 9-12. Using AI applications for teaching, learning and valuing mathematics in the classroom:

- application of statistical analysis of data for automated decision making
- application of probability of independent events for automated decision making (Naïve Bayes)
- application of conditional logic and pseudocode for automated decision making (Decision Trees)
- application of regions of the Cartesian Plane as automated classifiers (Support Vector Machine)
- application of linear algebra for search engines (Google PageRank)

#### Key takeaways:

1. Develop deeper student understanding of mathematics by exploring its use in artificial intelligence.
2. Inspire students to appreciate mathematics as an essential skill in modern society and its role in artificial intelligence.
3. Develop ethical thinking in students around the issues surrounding automated decision making that can impact humans and society.

Remember: Please bring your computing device and your CAS calculator.

### FULL H16 UNPACKING THE CONSTRUCTION OF AN INVESTIGATION TASK FOR MATHS METHODS

(Unpacking high quality teaching, learning, and resources)

Jeremy Elton and Steph Douglas, Peninsula Grammar School  
(Year 11 to Year 12)

This presentation is focused on designing an investigation task for Maths Methods. An example investigation task is provided that looks at the effects of the different coefficients in general quadratic and cubic functions. This presentation will also give a suggestion as to how to create a rubric for the investigation so that the task is straightforward to mark consistently across multiple classes.

#### Key takeaways:

1. An example investigation.
2. Some ideas around creating an investigation and how to create a rubric for it.

### FULL H17 DEVELOPING REASONING THINKING IN MIDDLE YEARS

(Focusing on the proficiencies at the heart of mathematics and numeracy learning)

Bernadette Mercieca, Our Lady of Mercy College Heidelberg  
(Year 5 to Year 8)

I plan to draw on the ideas of Pam Harris about the proficiency reasoning in middle years. I will discuss the importance of this proficiency and how it can be embedded in lessons so that students are not just mimicking the teaching they are taught but actively thinking and reasoning. Specific examples such as Problem Strings and tools such as area models and ratio tables will be shared. A full list mathematical strategies for improving reasoning will be shared with participants.

#### Key takeaways:

1. Reasoning Thinking Agency.

Remember: Paper and pen

### H18 SUPPORTING STUDENTS TO OWN THEIR THINKING WHEN OVERCOMING PRODUCTIVE STRUGGLE

(Unpacking high quality teaching, learning, and resources)

Susan Graham and Leah Gates, St Therese's School  
(F to Year 8)

According to Peter Liljedahl (2021), "if students aren't thinking, they aren't learning." When students have opportunities to think for themselves in mathematics lessons, they are likely to make and develop stronger connections and conceptual understanding. However, accurately gauging levels of student thinking can be a difficult thing for teachers to determine. Building classroom cultures where student dialogue is central to the learning is one way to capture student thinking. In this workshop, Susan and Leah will share their experiences of leading a school wide mathematics change. Through the introduction of talk moves the students

## SESSION H: Friday, 3.10pm-4.10pm (cont.)

at their school were strategically supported to communicate and articulate thinking when learning through challenging tasks and experiencing productive struggle.

### Key takeaways:

1. Understand various practices to promote student thinking.
2. Gain an insight into effective dialogic pedagogies.
3. Identify practices that support students to engage in productive struggle and rich dialogic experiences.

### FULL H19 MOVING IN MATHS - PLANNING FOR AN ACTIVE AND ENGAGING LEARNING ENVIRONMENT”

(Unpacking high quality teaching, learning, and resources)

**Mark Wilson, ACHPER Victoria  
(F to Year 12)**

Join us for an exciting and dynamic session focused on active math instruction!

In this session, we will explore how student motivation can be addressed through practical intervention initiatives, central to student engagement and success outcomes. We will explore the importance of presenting engaging tasks that allow students to make their own decisions on solving strategies. Participants will learn how to design real-world, open-ended tasks that are challenging, engaging, interconnected, and encourage mixed-ability collaboration. We will also explore strategies for viewing all students as capable mathematicians and providing timely and appropriate feedback to help them reflect on and build their understanding. Get ready to energize your math instruction and unlock the potential of movement in the classroom!

### Key takeaways:

1. Energising mathematics instruction and students’ positive dispositions.
2. Designing real-world, open-ended tasks that are challenging, engaging, interconnected.
3. Providing strategies for timely feedback and student reflection.

### H20 EMPOWERING STUDENT GROWTH: RUBRIC DRIVEN ASSESSMENT, DATA, AND DIFFERENTIATION.

(Improving assessment, through balancing formative and summative approaches)

**Lianna Beeching, Preston High School  
(Year 5 to Year 10)**

Follow Preston High School’s journey so far in developing a maths model that utilises developmental rubrics and formative assessment data to fully differentiate student learning.

In this session, we will:

- Explore real, in-context maths developmental rubrics, the thinking behind their design, how they link to assessments, and how they are used every day in the classroom by students.
- Start creating your own developmental rubric for an area of maths.
- Discuss real data from formative assessments and how it can be used to target content and teaching strategies in lessons.
- Review learning in a unit of work based on growth data after a summative assessment.
- Dig into the “why” of our approach: student confidence and engagement, using a growth focus to push all students to work hard, regardless of level.

This session will use examples from a Years 7-10 program, but could work well for Years 5-12.

### Key takeaways:

1. See real, in context examples of, and create your own maths developmental rubric.
2. Explore a maths assessment and teaching model focused on differentiation and individual student growth.
3. Use data from formative assessment rubrics to target in-class content and pedagogy to respond to student needs.

Remember: Laptop not needed, but would be helpful for creating rubrics. Bring a USB or email on the day if you want to have any resources from the session.

### H21 THE VICTORIAN CODING CHALLENGE SUPPORTING CODING/PROGRAMMING/ STEM IN SCHOOLS

(Unpacking high quality teaching, learning, and resources)

**Danijela Draskovic, The Mathematical Association of Victoria and Max Stephens, The University of Melbourne  
(Year 5 to Year 10)**

Last year (2022) over 2500 students from government primary and secondary schools participated in the VCC. This year, in 2023, we expect that the VCC will grow even larger, and further reaching to both government and non-government schools.

This session, coordinated by the MAV, will explain what the VCC is and show how it can be integrated into STEM. Delegates will also experience some of the tasks offered in our virtual kit. Teachers with several years’ experience in running the VCC and in developing a school wide STEM program will provide practical advice on getting involved in the VCC. Further they will discuss the logistics of implementation, as well as the vast benefits for students, other teachers, and the wider school community. See last year’s MAV report on the VCC for more information and background about this exciting program.

### Key takeaways:

1. Introduction to the Victorian Coding Challenge and experiencing the virtual resource.
2. Implementation advice from experienced and participating teachers.
3. STEM program development which includes the VCC.

Remember: This session is intended for school leaders and teachers of Years 5-10 interested in incorporating the VCC into their STEM programs. If possible, bring a laptop device in order to get the most out of the VCC immersion experience.

### H22 WOLFRAM LANGUAGE AND MATHEMATICA SOFTWARE FOR ALL.

(Unpacking high quality teaching, learning, and resources)

**Ian Willson  
(Year 7 to Year 12)**

The contemporary and recent usage of the Wolfram language and Mathematica in Victorian secondary schools has been largely confined to its use as a CAS tool for senior secondary Maths students. This has usually served to divert from or deny attention to a much wider use of the language by younger students, who when provided with appropriate exposure and introductory activities are easily able to grasp the ideas and coding syntax required and in the process learn how to do Maths and create and explore with it. It has particular current relevance to the development of algorithmic and pseudocode thinking (required later at VCE level in Mathematics Methods and Specialist Maths).

### Key takeaways:

1. Confidence with basic syntax and coding requirements.
2. Ideas and prepared activities to use in the classroom.
3. Tools for algorithmic thinking, pseudocode development and implementation (with reference to current VCAA requirements at senior level in Maths Methods and Specialist Maths).

Remember: Some familiarity with the Wolfram language and Mathematica is of value but not necessary. Those with access to the software on a laptop will have the opportunity to try some of the activities in the workshop.

### H23 GENERAL MATHEMATICS EXAMS: USING THE CAS CALCULATOR EFFICIENTLY AND EFFECTIVELY

(Unpacking high quality teaching, learning, and resources)

**Kevin McMenamin, Mentone Grammar  
(Year 9 to Year 12)**

This session will look at questions from this year’s General Maths papers and discuss how useful the CAS calculator was in determining responses. This would be particularly useful to teachers who are new to the subject and teaching for the first time. The session offers a hands-on experience that will give



## SESSION H: Friday, 3.10pm-4.10pm (cont.)

you the opportunity to use the calculator just like the students on all the questions where it would be most beneficial. The session is open to TI-Nspire and ClassPad users and the featured calculator will be the Casio ClassPad.

### Key takeaways:

1. Familiarisation of an approved CAS technology.
2. Applications of CAS functionality in a VCAA Examination.
3. Efficiency of approaches to solve and investigate questions thorough the use of a CAS technology.

Remember: Delegates can bring along their preferred CAS technology and a copy of the Examination papers.

### H24 IDEAS FOR TEACHING LOGIC AND PROOF IN SPECIALIST MATHEMATICS

(Unpacking high quality teaching, learning, and resources)

**Peter Flynn, Texas Instruments  
(Year 11 to Year 12)**

In this session I will offer ideas on how TI-Nspire CAS can be used to augment the effective teaching and learning of logic and proof.

### Key takeaways:

1. Augmenting the teaching of logic and proof.
2. Incorporating technology into the teaching of logic and proof.
3. Improving the teaching of induction proofs.

Remember: TI-Nspire CAS will be used. Users of other calculators are most welcome.

### H25 MATHEMATICAL INTUITIVE THINKING ABILITY IN HIGH SCHOOL

(Unpacking high quality teaching, learning, and resources)

**Sydney Tao, Strathcona Girls Grammar School  
(Year 9 to Year 12)**

It is important to develop mathematical intuition in students. The intuitive thinking ability is embedded in the mathematics curriculum which serves to enable students to respond to different situations and motivate students when making informed decisions and solving problems efficiently, therefore crucial to emphasize it during daily teaching. The purpose of this presentation is to find out the implication of mathematics intuition ability for teachers' daily practices and what reforms and actions are needed to teach the curriculum in a way that cultivates and encourages intuition ability in mathematical problem-solving.

### Key takeaways:

1. Definition of Mathematical Intuitive Thinking Ability
2. How intuition is presented in students' responses, what does intuition include in mathematical education, and what are the strategies to deliberately teach these abilities in the classroom.

## PRESENTER LIST

Nadia Abdelal: F23

Crystal Afitu: C20

Stephen Alderton: E11

Madeleine Anderson: E12

Kylie Armstrong: B24

Dearne Backhouse: E06, G02

Milton Bai: E17

Alana Bandholz: H08

Lianna Beeching: H20

Amanda Black: G21

Craig Blake: B24

Alex Box: B06, E03

Stephen Broderick: G13

Sarah Brooks: G21

Ian Bull: F12

James Burnett: C22, H07

Catherine Bushell: C14

Nicole Caddaye: G08

Marissa Cashmore: D04, H03

Jill Cheeseman: E02

Yun Chen: C03

Cho Cheong-Soo: C24

Michael Chisholm: B22

Jessica Clark: B13

Molly-Rose Clifton-Williamson: C01

Celia Coffa: D19

Mark Collins: D10

Peter Collins: A16

Benjamin Cooper: D09

Kate Copping: A20

Ellen Corovic: D02, E01

Sarah Crook: G04

Luke D'Astoli: D20

James Dann: B12

Will Davey: D05

Aylie Davidson: C05

Anthony Davies: D12

Steve De Domenico: D14

Ramya Deepak Kumar: E06, G02

Shane Dempsey: B10

Cathy Devlyn: A13

Georgia Dimitrovski: A03

Ben Dixon: E02

Steph Douglas: H16

Ann Downton: D02, E02

Danijela Draskovic: KT03, H21

Kate Eastcott: A17

Jeremy Elton: H16

Michaela Epstein: E20, G22

Catherine Epstein/Rodgers: A06, E24

Peter Flynn: B09, E25, H24

Zahara Forte: C20

Kara Fox: E25

Peter Fox: KT03, C12, G11, H09

Leah Gates: H18

Ann Gervasoni: F08

Emily Glen: C06

Greta Gomes: B15

Rachael Gore: G03

Lauren Gould: A18

Georgia Gouros: H15

Tim Grabovszky: C09

Susan Graham: H18

Andrew Greville: C10

Sheila Griffin: F01

John Grinstead: D18

Echo Gu: A14, D10

Alison Hall: G06

Scott Hamilton: D18

Marilyn Hand: H14

Paul Hooper: C23, D16

Olivia Hopwood: E12

Marj Horne: B11, F21

Samantha Horrocks: D09

Jane Hubbard: A08, C02, E04

Tania Hunter: E06, G02

Chris Hurst: E13, F22

Ashhad Ibrahim: B12

Hishaam Ibrahim: G15

David Innes: G19

Calvin Irons: C22, H07

Elizabeth Irwin: B01

Ye Ji Park: C24

Sally Jones: B08

Robert Kaplinsky: KF05, B17, C17

Vicky Kennard: F16

Eugenie Kestel: C13

Barry Kissane: F14

Isabella Kottek: E24

Jessica Kurzman: A08, G20

Renee Ladner: C07, E08

Stacey Lamb: B07

Mitchell Land: B24

## PRESENTER LIST (cont.)

John Lawton: F20	Carmel Mesiti: A20	Michael Rosenbrock: G18	Joanna Tutos: A12
Antje Leigh-Lancaster: A06, B23, C04, F17	Sanjeev Meston: A09, C25	Shubhankar Roy: B15	Elise van der Jagt: G07
David Leigh-Lancaster: C04, F15, G16	Carly Millichap: H08	Raymond Rozen: B10	Libby Vanderwyst: C01
Steve Lester: A07	Terence Mills: F11	James Russo: A08, C02, F08	Hung Vo: C01
Di Liddell: F01	Daniel Milutinovic: C11	Peter Sanders: D01, H01	Enzo Vozzo: A25, B16
Kathy Lin: H10	Michael Minas: KF04	Kerryn Sandford: B21	Nadia Walker: KF02, A05
Eric Lindberg: D24	Kate Molloy: C06	Dr Carly Sawatzki: KT05, B18	John West: D19, F02
Wenting Liu: C24	Robert Money: A24	Zoe Schaffner: G15	Kris Westcott: E07
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Andrew Lorimer-Derham: A19, D21, F10	Natasha Muller: A21	Alistair Shaw: E09	Ian Willson: H22
Oliver Lovell: KT04	Amy Nelson: F08	Kelli Simmons: G04	Melissa Wood: G21
Cassandra Lowry: D03	Michael Nelson: H05	Matt Skoss: C16, G17	Neale Woods: B14
Alastair Lupton: B25, F13	Damian Nicholson: G12	Darren Smyth: D25, G09	Joseph Wright: D22, E22
Michael MacNeill: A22, E23	Peideng Nie: E10	Amy Somers: E08, F03	Professor Nicola Yelland: KF01
Hannah Marino: A04	Andrea O'Connor: B22	Nery Soto: H12	Robert Yen: D25, G09
Russell McCartney: B04	Ursula Parker: G14	Kaye Stacey: E18	Gloria Yi: E17
Laura McClure: H12	Bernadette Pearce: A18	Paul Staniscia: C08, F04	Charelle Zammit: B08
Anna McGann: B20	Shelley Pendlebury: B13	Ruth Staniscia: D08, G01	
Leanne McMahon: F19	Michelle Perceval: G01	Erika Starcic: A03	
Paula McMahon: E13, F22	Taylor Pervan: A11	Max Stephens: H21	
Heather McMaster: F25	Tom Petsinis: E16	Brett Stephenson: D17	
Kevin McMenamin: E14, H23	Trang Pham: A10, F09	Leilani Stephenson: D17	
Allason McNamara: A13	Bridgeen Pritchard: E07	Liz Stoward: G20	
Donna McNeight: E05	Larissa Raymond: F18	Peter Sullivan: B02, C15	
Professor Chris Matthews: KF03	Julie Richards: G25	Jiqing Sun: D10, E15	
Geoffrey Menon: G14	Mike Ristovsky: A11	Sydney Tao: H25	
Bernadette Mercieca: H17	Andrew Robinson: G03	Christian Terlich: A07	
	Lucas Rocha: C18	Kathy Tessier: H19	
	Ange Rogers: B03, F06, H04	Dave Tout: A23, D11	

# GENERAL INFORMATION

## DATE AND TIME

MAV23 Annual Conference will be held on Thursday 30 November and Friday 1 December 2023 with registration opening at 8am located in the Union Building near the exhibition hall. Five Keynotes on each day will commence at 9.15am in the ELT rooms. Thursday sessions will commence at 11am and conclude at 4.10pm followed by networking drinks to 5pm. Friday sessions will commence at 11.00am and conclude at close of conference at 4.10pm.

## REGISTRATION

Registrations are now open and will close on Friday 17 November 2023. [Register now](#).

## CATERING

Beverage on arrival, morning tea, lunch and Thursday networking drinks will be available in the exhibition hall, Union Building.

## PROGRAM

All speakers and sessions were confirmed and correct at the time of release. MAV reserves the right to amend the program details as required.

## CANCELLATION POLICY

Participants who cancel their booking on or prior to the advertised closing date will receive a full refund less the cancellation fee of \$35. All cancellations must be in writing and include any documentation already sent out. No refunds are available after the advertised closing date as costs will have been incurred and catering booked. (Except in the case of illness, a 50% refund is available subject to supply of a medical certificate. The certificate and application for refund must be supplied in writing to MAV within 24 hours after the event.)

For information regarding the conference including presenters, sponsorship and exhibition contact: Jacqui Diamond, Conference Manager, [jdiamond@mav.vic.edu.au](mailto:jdiamond@mav.vic.edu.au).

## PRIVACY POLICY

We gather this information solely to manage your membership of the MAV and the services that we provide you.

## SESSION SELECTION

When registration payment is received, an email will be sent with a link to selection sessions. There will be a link for Thursday and for Friday sessions.

## PARKING

**Note: parking costs are not included in your conference registration fee.**

CellOPark Pay-As-You-Go (PAYG) is an easy alternative to parking meters which allows you to pay via an app, phone or online - only pay for the time you park.

Pay-by-Plate parking meters are a ticketless system using your vehicle registration - pay hourly or daily.

For all information regarding parking at La Trobe University, Bundoora visit [www.latrobe.edu.au/transport-central/car-parking/melbourne-parking](http://www.latrobe.edu.au/transport-central/car-parking/melbourne-parking).

We will not collect information that does not pertain to this. In order to serve the purpose of the Association - valuing mathematics in society - and to improve the service we provide the MAV may use collected information for evaluation and research purposes.

All collected information will be protected against loss and unauthorised use or disclosure. MAV will not disclose individual information to third parties without seeking express permission first. You will always be able to request access to the information the MAV holds about you.

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**ANZUK also sponsored the conference lanyards.**



[www.cambridge.edu.au/education](http://www.cambridge.edu.au/education)

Cambridge University Press Australia continues to lead the way in maths publishing for Australian schools. Our expert author team are across the changes to the Victorian Curriculum and will ensure you have all the resource you need to plan, teach and assess to the new curriculum, with a new edition of Essential Mathematics for the Victorian Curriculum coming in 2024. Our new Foundation Mathematics VCE resources, completing the renowned Cambridge Senior Mathematics VCE series, will be published over 2023 and 2024, delivering maths literacy and numeracy skills for life. Trust the innovative Cambridge print and digital resources to provide the very best maths outcomes for all year 7-12 students.

**Cambridge also sponsored the conference satchels.**



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**Texas Instruments also sponsored a conference keynote.**



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**Casio also sponsored a conference keynote.**



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The Department of Education (department) works with the Victorian schooling community to give every Victorian the best learning and development experience, making our state a smarter, fairer, and more prosperous place.

The department supports schools with evidence-based approaches for effective numeracy and mathematics teaching from birth to Level 10. The Mathematics Teaching Toolkit provides links to key mathematics and numeracy resources to support teachers, and their community. A key link in the toolkit is the Numeracy Improvement Guide for School Leaders that brings together new and previously published knowledge and research about excellence – and issues – in numeracy and mathematics education. In bringing these things together into one place, the Guide aims to provide coherence, as well as an agreed way forward for the system – about what works in numeracy improvement.

**The Department of Education also sponsored a conference keynote.**



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[www.abc.net.au/education](http://www.abc.net.au/education)

ABC Education brings teachers and students high-quality educational content for use in primary and secondary classrooms and at home. Our collection of over 3,000 resources is mapped to the Australian Curriculum, covering English, Maths, Science, Geography, History, The Arts and Technologies, including STEM.

Featuring originally produced videos, our portal also includes curriculum-relevant video clips and teacher guides for flagship ABC TV programs – e.g. War On Waste, The School That Tried To End Racism, Back In Time For Dinner, In My Blood It Runs, The Australian Dream. ABC Kids Listen and ABC Listen podcasts suitable for school-aged children are also featured.

Our popular games and interactives collection includes ‘made for the classroom’ learning tools, co-designed with teachers and curriculum and pedagogy experts.

A wide variety of our projects have been created in partnership with Australian museums, galleries and cultural institutions.

Until 2017, ABC Education was known as ABC Splash.

**ABC Education also sponsored the conference pens.**

## Participate in the exhibitor passport program for a chance to win prizes!

Each attendee will receive a Passport Program form in their Conference satchel. This passport program will also include the location map

Here's how to enter:

- Visit each exhibitor who is participating in the Passport Program for an engaging conversation or product demonstration!
- Exhibit representative will place a stamp on the Passport Program form.
- If you wish to go in the draw for Thursday prizes drop your Passport Program off at registration desk after lunch. You will be entered in the Happy Hour draw. If you are attending Friday, drop your passport program off at registration desk before 1.00pm on Friday
- Draws will be held on Thursday 30 November (at happy hour) and Friday 1 December (at 1.30pm) in the Exhibit Hall.
- **WINNER MUST BE PRESENT TO COLLECT PRIZE!**

*Passport Program is open to all MAV23 registered delegates and excludes exhibitors. Only one passport program form per registered attendee will be accepted as a valid entry. All contact information must be completed on the passport form to be eligible for the prize drawing.*

SPONSORS AND EXHIBITORS (cont.)

EXHIBITORS

















# MAVSHOP

WWW.MAV.VIC.EDU.AU/MAV-SHOP

## MAV MEMBERS GET A DISCOUNT ON ALL STOCK



### SNAPPY MATHS CLASS SET

K-6

This is the mathematical adaptation of 'Spot it'. Each pair of cards has exactly one mathematical match. Be snappy, the first to find it scores a point. This fast-paced game will help:

- Improve fluency and flexibility with numbers
- Promote multiplicative thinking
- Develop spatial reasoning
- Expose students to different representations of fractions
- Create discussion about shape properties.

The deck contains 31 game cards, links to online games and resources. This class set includes 7 decks.

**\$126 (MEMBER)**  
**\$150 (NON MEMBER)**



### MAV 2023 TRIAL EXAMS

VCE

Prepare effectively for VCE mathematics examinations with the MAV Trial Exams for Mathematical Methods, General Mathematics and Specialist Mathematics studies. Each trial exam features: Original questions, highly relevant to the current course, fully worked solutions for all sections and clear marking schemes. Exam formats are similar to those used by the VCAA. The purchasing institution has permission to reproduce copies for its students.

ALL STUDIES	<b>\$559.60 (MEMBER)</b> <b>\$699.50 (NON MEMBER)</b>
INDIVIDUAL STUDY	<b>\$232 (MEMBER)</b> <b>\$290 (NON MEMBER)</b>



### MAPPING MY DAY

1-5

Meet Flora, a precocious little girl who loves drawing, especially drawing maps - of her buried treasure, the breakfast table, the route to school, and more! Follow Flora and her family as she takes us through her day with maps.

Learning to read and draw maps is a fun and interactive way for children to develop spatial thinking skills - how we think about and understand the world around us and use concepts of space for problem solving. Early exposure to map concepts can help foster this type of cognitive development in children and boost their maths and science learning as they progress through school.

**\$21.85 (MEMBER)**  
**\$27.30 (NON MEMBER)**



### UNDERSTANDING AND TEACHING PRIMARY MATHEMATICS IN AUSTRALIA

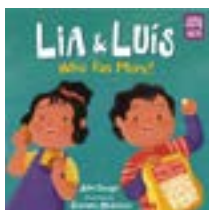
F-6

Written by best-selling author and teacher educator, Tony Cotton, in collaboration with experienced Australian primary maths teachers, Jess Greenbaum and Michael Minas, this book combines pedagogy and mathematics subject knowledge to build teachers' confidence both in their mathematical subject knowledge and in their ability to teach mathematics effectively.

Adapted for Australian pre and in-service teachers, the book covers all the key areas of the Australian Curriculum: Mathematics, from teaching number and calculation strategies, to exploring geometry and statistics. Chapters deal with the teaching of mathematics in the early years; inclusive approaches to mathematics teaching, teaching mathematics using digital technologies, as well as assessment and how to teach mathematical topics across the curriculum. Learning is scaffolded by a clear chapter structure that includes starting points, big ideas, teaching points, portfolio tasks, chapter summaries and reflections, as well as taking it further sections to extend learning.

This book is stimulating, accessible and contains a wealth of practical ideas for use in the classroom.

**\$53.20 (MEMBER)**  
**\$66.50 (NON MEMBER)**



### LIA & LUIS...WHO HAS MORE?

F-2

Twins Lia and Luis argue over who has more of their favorite snacks. Can the siblings use maths - and a little sharing - to pick the winner? A playful exploration of measurement, counting, and estimation.

**\$12.70 (MEMBER)**  
**\$15.90 (NON MEMBER)**



THE MATHEMATICAL  
ASSOCIATION OF VICTORIA

**TO ORDER**  
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**OR CALL +61 3 9380 2399**

*Prices are subject to change.*