

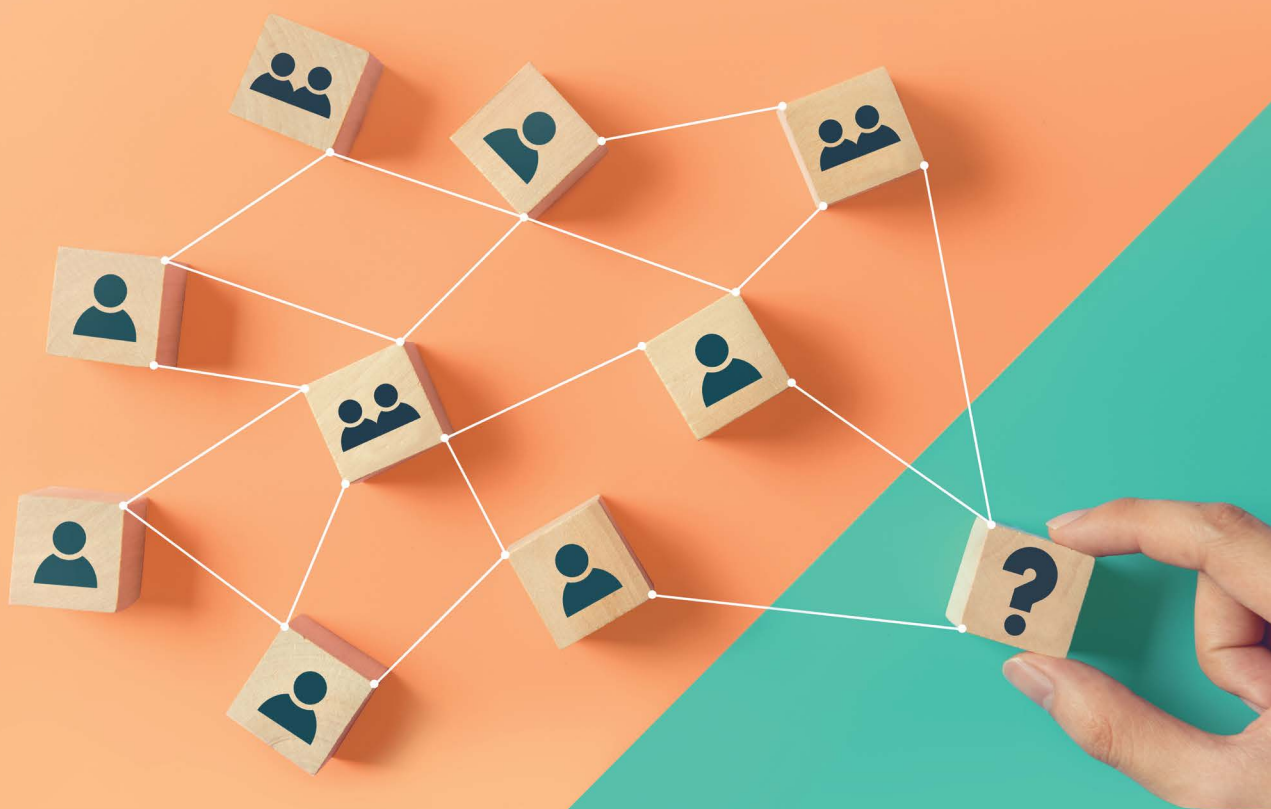


THE MATHEMATICAL
ASSOCIATION OF VICTORIA

MAV21
CONFERENCE

2-3 DECEMBER

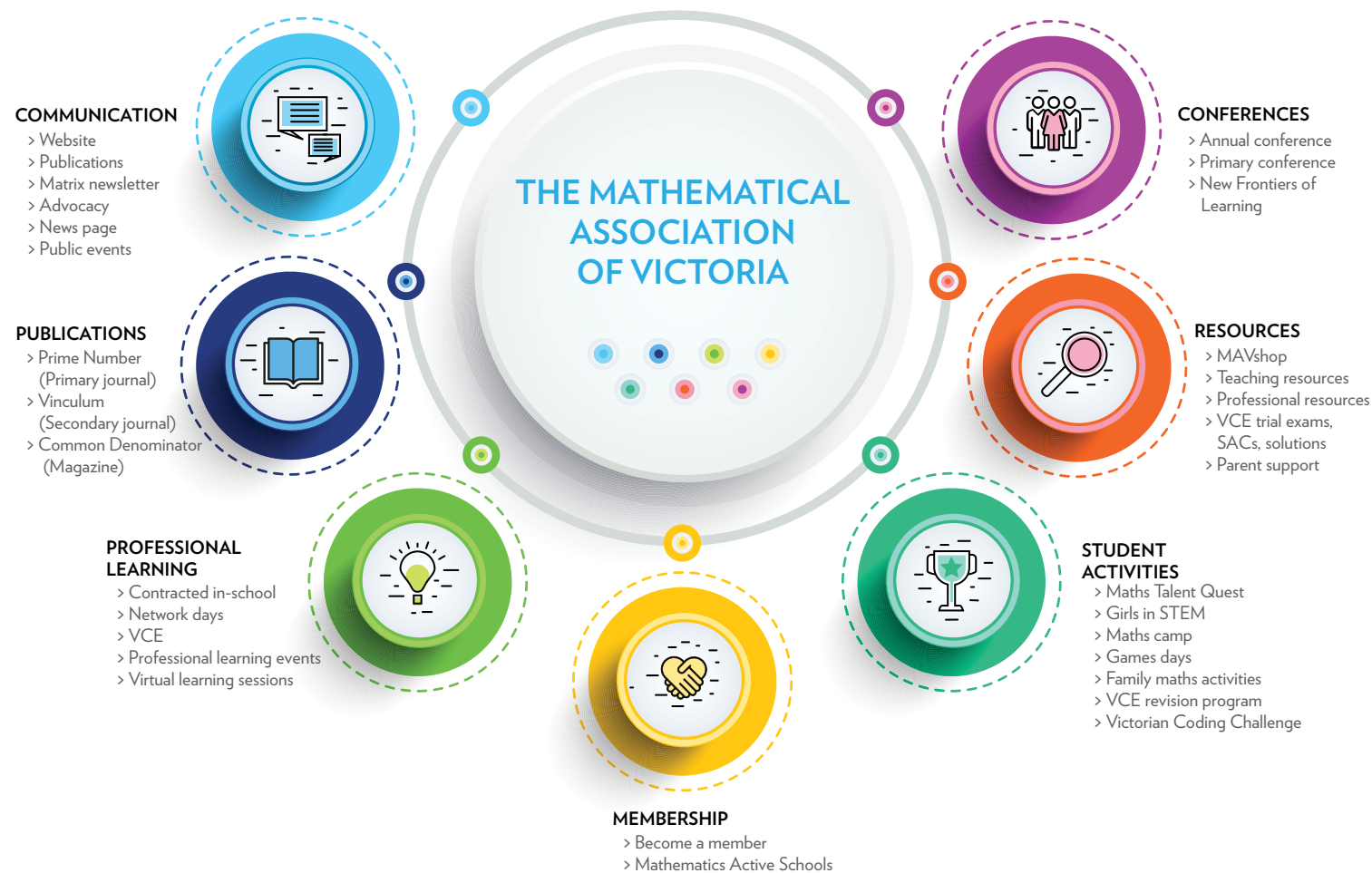
THE CAPABILITIES IN MATHEMATICS TEACHING & LEARNING



CONFERENCE SYNOPSIS

58th Annual Conference
Virtual Platform

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WELCOME TO MAV21



Welcome to MAV21 – The Capabilities in Mathematics Teaching and Learning

On behalf of the MAV Board and the conference committee I invite you to the 58th Annual Conference and our second conference online.

MAV21 will be held online from Thursday 2 to Friday 3 December 2021. The theme for MAV21, *The Capabilities in Mathematics Teaching and Learning*, sets the stage to share new, forward-thinking concepts, and leading best practices among mathematics educators. The future workforce and societies' development and sustainability require a strong focus on the capabilities. Often called entrepreneurial or 21st Century skills, the capabilities underpin how our students think, understand themselves, engage with each other, society and their learning, alongside their deepening understanding of mathematics.

We are anticipating over 800 mathematics educators including teachers, academics, policy makers, curriculum experts and resource developers coming together to share their collective expertise, experiences, and ideas. Join us online to share your ideas, stories, and enthusiasm for engaging in mathematics.

- Ann Downton, Conference Convenor

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SCHEDULE

Thursday 2 December 2021	
9am - 9.15am	Opening and welcome
9.15am - 10.15am	Keynote presentations
10.15am - 10.25am	Coffee break
10.25am - 11.10am	Sessions
11.10am - 11.20pm	Coffee break
11.20am - 12.05pm	Sessions
12.05pm - 12.15pm	Coffee break
12.15pm - 1pm	Sessions
1pm - 1.45pm	Lunch
1.45pm - 2.30pm	Sessions
2.30pm - 2.40pm	Coffee break
2.40pm - 3.25pm	Sessions
3.30pm	End of day 1
Friday 3 December 2021	
9am - 9.15am	Opening and welcome
9.15am - 10.15am	Keynote presentations
10.15am - 10.25am	Coffee break
10.25am - 11.10am	Sessions
11.10am - 11.20pm	Coffee break
11.20am - 12.05pm	Sessions
12.05pm - 12.15pm	Coffee break
12.15pm - 1pm	Sessions
1pm - 1.45pm	Lunch
1.45pm - 2.30pm	Sessions
2.30pm - 2.40pm	Coffee break
2.40pm - 3.25pm	Sessions
3.30pm	Conference close

KEYNOTES

Keynotes will be live from 9:15am – 10:15am.

PRESENTERS



SHARYN LIVY

ELICITING CRITICAL THINKING THROUGH THE USE OF SEQUENCES OF CONNECTED CUMULATIVE CHALLENGING TASKS

Early years

Dr Sharyn Livy is a Senior Lecturer of mathematics education at Monash University. Her research and teaching are driven by the desire to understand how teachers can be supported to extend their knowledge and pedagogical approaches for teaching mathematics. Improving teacher knowledge and practices were the driving force behind Sharyn's PhD thesis, a study of pre-service teachers' mathematical content knowledge. Sharyn's current research includes an Australian Research Council (ARC) Linkage project titled Exploring Mathematics Sequences of Connected, Cumulative and Challenging tasks project (EMC³) with colleagues. Her contribution to the broader mathematical education community is wide and includes past VP (Treasurer) of the Mathematics Education Research Group of Australasia and regular presenter at MAV's annual conference.



JODIE MILLER

ENACTING INTERCULTURAL CAPABILITIES THROUGH EARLY ALGEBRAIC THINKING

Primary

Dr Jodie Miller is the Deputy Head of School in the School of Education at the University of Queensland. Her teaching and educational research explore best practice in mathematics and STEM education. As a primary school teacher working in culturally diverse school communities, Jodie wanted to understand how students develop conceptual understandings of mathematics and what teaching actions could foster success for all students.

Being curious about teaching and learning led Jodie to establish a career in classroom research, where she works with teachers and students to enhance the conditions for mathematics learning. Through this work, Jodie has established a national reputation for her research exploring

algebraic thinking, robotics and coding; mathematics learning within families, communities and early years settings; and culturally responsive approaches to supporting Indigenous students' mathematics learning. A commitment to equity and social justice means Jodie's research is primarily focused on supporting those most at risk of marginalisation from the school curriculum.

PANEL: SECONDARY

THE CAPABILITIES IN MATHEMATICS AS A VEHICLE TO PREPARE STUDENTS FOR THEIR PROFESSIONAL, PERSONAL AND CIVIC LIVES

Claire Delaney is a teacher of mathematics and science at Lalor Secondary College where she has worked for over 10 years. She has held various roles such as High Potential Program Leader and Numeracy Leader during which she explored and implemented ways to engage and challenge students as well as provide support in areas in which they struggle.

More recently, Claire has taken on the role of Learning Specialist specialising in Inquiry Based Learning in which she will be responsible for developing and training teachers in the introduction of an inquiry-based program at Year 8. This will include the use of mathematics and other disciplines in the immersion of students in real world, deep thinking, engaging tasks which will cross the barriers of curricula and industry.



Fernando Ianni is in his 38th year teaching in state education with 13th year as Principal at Roxburgh College, located in Melbourne's outer north corridor. The College caters for Year 7 to 12 across two sites, which includes a FLO campus, the Gateway School.

Described by his peers as a visionary, Fernando has inspired and implemented numerous initiatives to overcome disadvantage in Melbourne's outer north. From refugee support groups to vocational programs for disengaged youths. Fernando has an absolute commitment to equity and inclusion. Through his school's vision statement – 'With mutual respect, we learn and achieve' – he has instilled a collective responsibility in the Roxburgh College culture, curriculum and community.

Fernando leads with a moral purpose and a determination to support and empower every one of his students to

successfully complete the education journey. He is a lifelong learner who understands the importance of education and the need to keep improving.

Fernando has taught in the Mathematics and Science Domains, as well as in Education at Higher Education, TAFE and Secondary school in Australia and in the UK.

Kylie Slaney is the Acting Leader of Learning, Mathematics and Computing at Carey Baptist Grammar School. She has been a secondary teacher for 8 years, teaching Mathematics Year 7-12 and STEM and Computing electives in the Middle School. Prior to teaching, Kylie worked in the IT Industry, with a Bachelor of Engineering



(Electronics). Kylie focusses her energies on developing students' abilities to engage in their learning, inspiring and supporting students to develop a growth mindset, supporting students to engage in non-routine problem solving, making their thinking visible. As a mathematics teacher she is an advocate for STEM, teaching and writing STEM curriculum and supporting students in the Lego Robotics Competitions. Her passion is to help students connect life skills to mathematics.



David Tout is an experienced numeracy and maths educator who is particularly interested in making maths relevant, interesting and fun for all students especially those students who are disengaged from mathematics. He has

over 40 years' experience, mainly in the VET sector, and has worked in schools, TAFEs, ACE providers, universities and workplaces. Dave has worked at a state, national and international level in research, curriculum, resource development, assessment and professional development. Dave has written numeracy and maths curriculum including for the VCE and VCAL, and is an author of the Australian Core Skills Framework (ACSF). Dave has been involved in international numeracy/ maths assessments including PISA and PIAAC. Dave is currently chair of the Numeracy Expert Group for the OECD's international survey of adult skills (PIAAC).

This keynote presentation is supported by



ASHLEIGH KOO AND THOMAS MOORE

TEACHING IN ACTION: USING PROBLEM BASED LESSONS TO DEVELOP STUDENT CAPABILITIES IN MATHEMATICS

Secondary



Anyone who knows Ashleigh Koo is aware that she *loves* teaching mathematics. She has worked as a maths educator in primary and secondary settings. She is a Learning Specialist for Mathematics at Victoria University Secondary College.

Ashleigh is studying a Master of Education at Melbourne University, taking a special interest in mathematics education. She is focussed on improving not only her own teaching, but also facilitating professional development to advance the pedagogy of those around her. Ashleigh is particularly interested in the role that gender plays in mathematics education, looking at ways to support all people in choosing mathematics as a career pathway. This is Ashleigh's first experience presenting at MAVCON and she is extremely excited to share her experiences in the classroom with you all.



It does not take long to notice that Thomas Moore is extremely passionate about teaching Mathematics. He is the founder of EngageME Mathematics and is currently completing his PhD, exploring how Maths teachers build productive pedagogical relationships

with their students in the middle years. Thomas has been a leading teacher (Head of Mathematics) in the past, and he is currently working as a tutor at Frankston High School. He is also interested in school leadership and affording Maths teachers the agency to take risks and develop their craft. Thomas loves presenting at conferences, and he looks forward to sharing his learnings with you at this year's MAVCON.

This keynote presentation is supported by



- INTERNATIONAL SPEAKER -



PETER LILJEDAHL

BUILDING THINKING CLASSROOMS

All levels

Dr. Peter Liljedahl is a Professor of Mathematics Education in the Faculty of Education. He is the former president of the International Group for the Psychology of Mathematics Education (PME), the current president of the Canadian Mathematics Education Study Group (CMESG), senior editor for the International Journal of Science and Mathematics Education (IJSME), on the editorial boards of ESM, JMTE, MERJ, MTL, CJSMT, and a member of the NCTM Research Committee.

Peter is a former high school mathematics teacher who has kept his research interest and activities close to the classroom. He consults regularly with teachers, schools, school districts, and ministries of education on issues of teaching and learning, problem solving, assessment, and numeracy.

This keynote presentation is supported by



JENNIFER BOWDEN

MATHEMATICAL THINKING IN THE EARLY YEARS: DEVELOPING CRITICAL AND CREATIVE THINKERS FOR OUR FUTURE!

Early years

Jennifer Bowden has worked as an Education Consultant at the Mathematical Association of Victoria for 14 years. She enjoys inspiring teachers, maths coaches, consultants and leaders to become more critical and creative in their teaching, empowering consultants, and teachers to be better educators and provide the best learning experiences for their students.

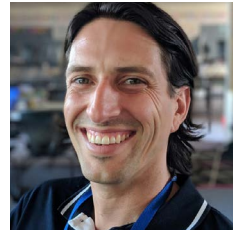
Jen coaches, mentors and guides consultants, teachers, and leaders to build teacher capacity, increase knowledge of curriculum content, and to develop better pedagogies to establish school-wide improvement. Jen's current interest is in helping teachers to improve their own teaching in a way that promotes and challenges students' thinking



TOBY RUSSO AND JAMES RUSSO

MATHEMATICS IN A MULTI-AGE SETTING.

Primary



Toby Russo is a learning specialist, maths leader and classroom teacher at Spensley Street Primary School in Melbourne, Victoria. He works in a unique multi-age, open-plan environment and is actively exploring how to engage and challenge all learners through careful task design. He regularly collaborates with his brother James on research projects. Recent projects include exploring the ways maths games are used by Australian teachers and action research into the impact of leveraging teacher passion to engage students in their mathematical learning. He has published in a number of teacher practitioner journals and enjoys sharing tasks that use narrative hooks to contextualise problem-solving.



James Russo is a researcher and pre-service teacher educator based out of Monash University, Victoria. His research interests include:

- teacher and student emotional responses in the primary mathematics classroom.
- the role of challenging tasks, games, and children's literature as pedagogical approaches to support positive student learning experiences in primary mathematics.
- better understanding the relationship between classroom practice and academic research
- the learning and teaching of mental computation and estimation.

James writes regularly for a range of teacher practitioner journals and continues to spend some of his week team-teaching in a primary classroom. He uses this as a space to develop and test teaching ideas, and to stimulate thinking about his research. James is currently working on an Australian Research Council project looking at developing sequences of learning experiences built around challenging tasks.

This keynote presentation is supported by



MATT SKOSS

GENERAL CAPABILITIES... STRATEGIES FOR INFUSING THEM INTO STUDENT LEARNING

Secondary (7-10)

Matt Skoss is an experienced classroom teacher, having taught for over 30 years, most recently at Centralian Senior College, and Centralian Middle School (formerly Alice Springs High School). He has enjoyed several curriculum roles with a Maths and ICT focus for the Northern Territory Department of Education. He has also worked as a consultant for schools in Australia, with a strong interest in supporting remote and country schools. In 2016-19, Matt worked for the Australian Association of Mathematics Teachers on a collaborative project, reSolve: Maths by Inquiry, with the Australian Science Academy. His role has been working with Champions, developing the human legacy of the reSolve Project. Matt is committed to developing and supporting Maths300, a subscription-based collection of rich maths lessons that typically work very well across a broad range of students, creating an environment for students to 'work like a mathematician.' <http://maths300.com>.

This keynote presentation is supported by



SARAH FENTON, JENNIFER PALISSE AND HELEN SILVESTER

MATHEMATICS BY DESIGN

Secondary (7-10)



With over 15 years' experience working in education across the government, independent and not-for-profit sectors, a large focus of Sarah Fenton's work has been exploring how design thinking can be used as a framework in existing and new learning design. She is also interested in the alignment of the design thinking process and principles with the general capabilities and how this may elevate the capabilities in curriculum design and in the classroom. Sarah is Principal Consultant at Square the Circle, a consultancy focussed on re-imagining what is possible in education and youth engagement.



Jennifer Palisse is a mathematics educator who enjoys designing unconventional but engaging activities. She enjoys using hands-on manipulatives in collaborative settings, often with the use of CAS, to encourage students to become curious about the mathematical world around them.

Jennifer now works with Monash Tech School delivering enrichment material for high-achieving primary students that include investigations including magic tricks, spirographs, puzzle solving, and more! She is also completing her PhD, investigating the use of comparative judgement as an alternative approach to peer assessment.



Helen Silvester has been an educator for over 20 years and has a wealth of experience writing and reviewing in STEAM and the Sciences. She has written STEAM curriculum for the Australian Science Teachers Association websites and Oxford

University Press, as well as reviewed VCE examinations for the Science Teachers Association of Victoria. In a previous life, Helen worked as a researcher at Walter and Eliza Hall Institute and the Royal Children's Hospital. She is currently the Director of the STEAM-focused Casey Tech School.

This keynote presentation is supported by



PANEL: ALL LEVELS

FIRST NATIONS STUDENTS AND MATHEMATICS EDUCATION, LESSONS FOR AUSTRALIA



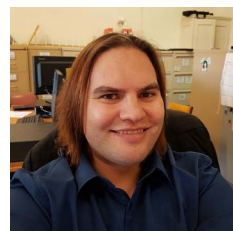
Cynthia Nicol is a Professor in the Department of Curriculum and Pedagogy at the University of British Columbia, Vancouver Canada. Cynthia's research brings together intersecting theories of culturally responsive pedagogies with place-

based pedagogies, Indigenous epistemologies and critical mathematics education. Her long-term collaborative research with teachers, school administrators, Elders, and community members on Haida Gwaii in the Pacific northwest, has formed the context for much of this work. With community members she developed a living model of culturally responsive education. The books *Tluuwaay Waadluxan: Mathematical Adventures* and *Living Culturally Responsive Mathematics Education with/in Indigenous Communities* exemplify some of this work that intends to make mathematics education more relational and responsive for all learners.



Dr Jodie Hunter is an Associate Professor in mathematics education at the Institute of Education at Massey University, New Zealand. Previously she was a Research Fellow and Lecturer at the University of Plymouth in the United Kingdom. Within New Zealand,

Jodie co-leads a large-scale professional development and learning project which focuses on developing culturally-responsive teaching to address under-achievement in mathematics for Pasifika and Māori students at low socio-economic schools. Her research interests include mathematics education for equity and social justice, early algebra, and culturally sustaining pedagogy. Jodie is currently a Rutherford Discovery Fellow and was previously a Fulbright scholar at the University of Arizona.



Mathew Lillyst belongs to the Gunditjmara people of southwest Victoria. He has worked in public and private schools across Australia, primarily as an English and humanities teacher, and in the tertiary sector as a sessional academic in literacy and Aboriginal education. He is currently the Professional Practice Leader – Koorie Literacy and Numeracy at the Department of Education and Training. In addition to his professional career, Mathew was also one of the contributing authors for the anthology *Growing Up Aboriginal in Australia*.



Daniel Steele is an Assistant Principal of Aldercourt Primary School in North Frankston. Over the last 13 years he has working within primary schools, including two years in the remote Aboriginal community of Bidadanga in WA, and undergraduate tutor

at ACU and Deakin University. His passions are student engagement, maths education, coaching and mentoring, and designing curriculum that looks a little different. He has a BEd (Hons.), an MEd Leadership (Leading Learning), and is currently completing a PhD. in Education at Monash University.

This keynote presentation is supported by



Education and Training

MAV MEMBERSHIP



The Mathematical Association of Victoria (MAV) promotes the importance of mathematics to society. MAV has over 1400 members from all sectors of education including individuals, schools, universities. We provide membership benefits to a growing network of over 15,000 mathematics educators and reach over 60,000 educators, students and parents across metropolitan and regional Victoria via our 100+ 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, Girls in 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.



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.

HOW I CAN I GET INVOLVED IN THE MAV?

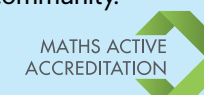
MAV depends on its members for success. Extend your professional learning and get involved in MAV's activities:

- present at MAV's annual conference
- join one of our networks, or start your own with MAV support
- write for MAV journals
- join committees and working parties
- 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 2 DECEMBER 2021

SUB-THEMES

Capability development in students	Valuing mathematics in society
Numeracy in context	Multiple sub-themes
ICT capabilities	

YEAR LEVEL RANGE: For actual target year levels per session see session descriptions.

Rooms 1, 2, 6, 7	Foundation to Year 8
Rooms 3,4,8,9	Year 7 to Year 12
Rooms 5, 10	Misc levels

Time	Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8	Room 9	Room 10
9am -9.15am	Opening and welcome / Annual sponsor promotion									
9.15am-10.15am	<p>Early years</p> <p>Eliciting critical thinking through the use of sequences of connected cumulative challenging tasks.</p> <p>Sharyn Livy</p>	<p>Primary</p> <p>Enacting intercultural capabilities through early algebraic thinking</p> <p>Jodie Miller</p>	<p>Secondary</p> <p>The capabilities in mathematics as a vehicle to prepare students for their professional, personal and civic lives</p> <p>Panel: Claire Delaney, Fernando Ianni, Kylie Slaney, David Tout</p> <p>Brought to you by</p> <p> TEXAS INSTRUMENTS</p>	<p>Secondary</p> <p>Teaching in action: using problem based Lessons to develop student capabilities in Mathematics</p> <p>Ashleigh Koo Thomas Moore,</p> <p>Brought to you by</p> <p>anzuk.education</p>	<p>All levels</p> <p>Building thinking classrooms</p> <p>Peter Liljedahl</p> <p>Brought to you by</p> <p> CAMBRIDGE UNIVERSITY PRESS</p>					
10.15am - 10.25am	Coffee break									
10.25am-11.10am	<p>Planning to maximise number</p> <p>Cassandra Lowry</p>	<p>Using cultural artefacts to explore geometry concepts</p> <p>Kate Copping, Carmel Mesiti, Cath Pearn</p>	<p>Utilising textbook-based questions to promote students' capability of thinking beyond procedures</p> <p>Echo Gu, Jiqing Sun</p>	<p>2020 Mathematical Methods Examinations</p> <p>Allason McNamara, Rob Watson</p>	<p>Driving your own brain: metacognition in mathematics</p> <p>Lyn Coote</p>	<p>Improving mathematics outcomes of First Nations Australian learners through culturally responsive pedagogy and curriculum</p> <p>Caty Morris</p>	<p>What does it really mean to think mathematically?</p> <p>Ellen Corovic</p>	<p>New teacher series, part 1: Effective and powerful pedagogical approaches. Thrive in your first 5 years of teaching!</p> <p>Danijela Draskovic</p>	<p>Using computers in a maths classroom and home learning with Year 11/12+ students</p> <p>Robert Rook</p>	<p>Mathematical entrees - reasoning starters</p> <p>Andrew Lorimer-Durham</p>
11.10am-11.20am	Coffee break									
11.20am-12.05pm	<p>Teacher planning - time for a change?</p> <p>Susan Graham, Jane Hubbard</p>	<p>What is the BIG Idea?</p> <p>Michael Minas</p>	<p>Problems Worth Coding - Episode IV</p> <p>Peter Fox</p>	<p>2020 Specialist Mathematics Examinations</p> <p>Dean Lamson , Allason McNamara</p>	<p>Teaching Middle School Maths for Conceptual Understanding</p> <p>Nadia Abdelal</p>	<p>Using reasoning to develop deep understanding</p> <p>Michael Nelson</p>	<p>Statistics and Probability Number Talks</p> <p>Catherine Epstein/Rodgers</p>	<p>New teacher series, part 2: Effective use of ICT. Our favourite digital tools. [Thrive in your first 5 years of teaching!]</p> <p>Danijela Draskovic</p>	<p>The new VCE Foundation Maths: Enhancing student capabilities in mathematics for use in everyday life, future study and work</p> <p>Justine Sakurai, Dave Tout</p>	<p>Area (and how to use it to teach the entire curriculum)</p> <p>Chris Wetherell</p>

SESSION SUMMARY: THURSDAY (cont.)

THURSDAY 2 DECEMBER 2021

SUB-THEMES

Capability development in students	Valuing mathematics in society
Numeracy in context	Multiple sub-themes
ICT capabilities	

YEAR LEVEL RANGE: For actual target year levels per session see session descriptions.

Rooms 1, 2, 6, 7	Foundation to Year 8
Rooms 3,4,8,9	Year 7 to Year 12
Rooms 5, 10	Misc levels

12.05pm-12.15pm	Coffee break									
Time	Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8	Room 9	Room 10
12.15pm-1pm	Student voice and agency to promote critical and creative thinkers in the mathematics classroom <i>Stacey Lamb</i>	Transforming the maths experience - a community learning project <i>Alex Box</i>	STEM activities in astronomy <i>Stephen Broderick</i>	Measurement in practical contexts <i>Marj Horne, Rebecca Seah</i>	What is the problem with problem solving? <i>Janine Sprakel</i>	My top 5 tips for running a successful parent maths night: maths advocacy in action <i>Angela Rogers</i>	Taking teacher maths support to the next level <i>Sophie Matta</i>	Introduction to the mathematics of machine learning <i>Georgia Gouros</i>	Enhancing learning outcomes with CAS (TI-Nspire) in Mathematical Methods <i>Sanjeev Meston</i>	MathsCraft - doing maths like a research mathematician <i>Anita Ponsaing</i>
1pm-1.45pm	Lunch break and networking function									
1.45pm-2.30pm	It is a matter of time <i>Carmel Delahunty, Judy Gregg</i>	Addressing the capabilities through contextual problem posing <i>Kate Eastcott</i>	Promoting numeracy across the secondary curriculum <i>Helen Forgasz, Jennifer Hall, Gillian Kidman</i>	Creating an engaging mathematics classroom through programming <i>Robin Wang</i>	How to make GeoGebra a learning tool for students. <i>Narcisa Corcaci, Uyen Lavie Vo</i>	Sharing the love: tips for having your ideas published. <i>Angela Rogers</i>	Taking mathematics out of the classroom <i>Kristen Westcott</i>	Using mathematics to drive future-focused financial capability <i>Jill Brown, Carly Sawatzki</i>	Mathematical investigations for the new VCE structure <i>Brian Lannen</i>	Building a community of mathematicians <i>Alex Fox, Kathy Harrison, Jeff Segal</i>
2.30pm-2.40pm	Coffee break									
2.40pm-3.25pm	Rich Mathematical Connections <i>Marissa Cashmore</i>	Making maths fun through contexts <i>Bernard Kerrins</i>	Imagine if all our students considered themselves 'maths people' <i>Lindy Bayles, Julian Lumb</i>	How risky is life? <i>Kaye Stacey</i>	Spiralling through the surds <i>Roger Wander</i>	Developing maths concepts with receipt roll and number lines <i>Tierney Kennedy</i>	NBA math hoops <i>Nick Devereux</i>	To CAS or not to CAS? <i>Chris Ireson</i>	On writing a mathematics assessment for learning <i>Paul Allsopp, Robin Wang</i>	
3.30pm	Conclusion of day one									

SESSION SUMMARY: FRIDAY

FRIDAY 3 DECEMBER 2021

SUB-THEMES

Capability development in students	Valuing mathematics in society
Numeracy in context	Multiple sub-themes
ICT capabilities	

YEAR LEVEL RANGE: *For actual target year levels per session see session descriptions.*

Rooms 1, 2, 6, 7	Foundation to Year 8
Rooms 3,4,8,9	Year 7 to Year 12
Rooms 5, 10	Misc levels

Time	Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8	Room 9	Room 10
9am -9.15am	Opening and welcome / Annual sponsor promotion									
9.15am-10.15am	<p>Early years</p> <p>Mathematical thinking in the early years: Developing critical and creative thinkers for our future!</p> <p>Jennifer Bowden</p>	<p>Primary</p> <p>Mathematics in a multi-age setting.</p> <p>Toby Russo and James Russo</p> <p>Brought to you by</p> <p>EssentialAssessment Assessment and Curriculum made easy Australian Curriculum • NSW Syllabus • Victorian Curriculum</p>	<p>Secondary (Yr 7-10)</p> <p>General capabilities... strategies for infusing them into student learning</p> <p>Matt Skoss</p> <p>Brought to you by</p> <p>AMT AUSTRALIAN MATHS TRUST</p>	<p>Secondary (Yr 7-10)</p> <p>Mathematics by design</p> <p>Sarah Fenton, Jennifer Palisse, Helen Silvester</p> <p>Brought to you by</p> <p>OXFORD UNIVERSITY PRESS</p>	<p>All levels</p> <p>First Nations students and mathematics education, lessons for Australia</p> <p>Panel: secondary</p> <p>Jodie Hunter, Mathew Lillyst, Cynthia Nicol, Daniel Steele</p> <p>Brought to you by</p> <p>VICTORIA State Government Education and Training</p>				<p>Room 9 sponsor</p> <p>Sparx Maths</p>	
10.15am - 10.25am	Coffee break									
10.25am-11.10am	<p>Work like a mathematician with Professor Morris!</p> <p>Jennifer Bowden, Douglas Williams</p>	<p>Teaching and assessing the capabilities through authentic mathematical tasks and projects</p> <p>Jess Szalek</p>	<p>The place of manipulatives in the secondary classroom</p> <p>Vicky Kennard</p>	<p>VCAA Further and General Mathematics - helpful hints</p> <p>Rebecca Hansen, Neale Woods</p>	<p>Infusing Aboriginal perspectives in your mathematics lessons</p> <p>Aylie Davidson, Mathew Lillyst</p>	<p>An instructional model that supports structured inquiry approaches</p> <p>Peter Sullivan</p>	<p>Bringing computational thinking and dynamic models to the classroom</p> <p>Kelly Lean, Farid Pasha</p>	<p>What role does mathematics education play in developing students' 21st Century skills and STEM capabilities?</p> <p>Rachael Whitney-Smith</p>	<p>Different numeracies for the digital age: putting applied learning up front in VCE</p> <p>Justin Sakurai, Dave Tout</p>	<p>The power of purposeful puzzles</p> <p>Andrew Lorimer-Durham</p>
11.10am-11.20am	Coffee break									
11.20am-12.05pm	<p>Using reverse fraction tasks to promote reasoning.</p> <p>Kate Copping, Carmel Mesiti, Cath Pearn</p>	<p>MathUp</p> <p>Hannah Marino</p>	<p>Free financial literacy education resources to deliver numeracy in context</p> <p>Damien Nicholson</p>	<p>Further Maths Exams: using the CAS calculator efficiently and effectively</p> <p>Kevin McMenamin</p>	<p>Let's open with number talks</p> <p>Alex Box</p>	<p>Picture this...</p> <p>Amanda Cassidy</p>	<p>It is a matter of time</p> <p>Carmel Delahunty, Judy Gregg</p>	<p>Geometry expressions and GX Web - Putting the umph into geometry</p> <p>Neale Woods</p>	<p>MYLNS - Snapshots of successful practice</p> <p>Naomi Coleman, Helen Haralambous, Carly Joyce, Lachlan Hillier, Kylie O'Sullivan</p>	<p>Using Islamic and traditional geometry to learn pattern, shape and number</p> <p>Nabeel Khan</p>
12.05pm-12.15pm	Coffee break									
12.15pm-1pm	<p>Rekenrek 101: How to teach numerous maths facts/ concepts with this versatile math manipulative.</p> <p>Amy How</p>	<p>Disposition. the 5th proficiency strand.</p> <p>Paul Staniscia</p>	<p>Kant and mathematics</p> <p>Terence Mills</p>	<p>Using AI and machine learning to dramatically improve marking in mathematics</p> <p>Brenton Wyett</p>	<p>The skill, will and thrill</p> <p>Shane Crawford</p>	<p>Teaching in reasoning in statistics and probability</p> <p>Michelle Fyfe, Dilys Potter, Hannah Young</p>	<p>Change the attitude towards maths</p> <p>Kylie Love</p>	<p>Kicking goals and falling ladders</p> <p>Peter Fox</p>	<p>The net worth of networks: getting ready for the new AC</p> <p>Anna McGann, Bex Thompson</p>	<p>Equity and agency within mathematics education</p> <p>Andie Hoyt, Daniel O'Kane,</p>

SESSION SUMMARY: FRIDAY (cont.)

FRIDAY 3 DECEMBER 2021

SUB-THEMES

Capability development in students	Valuing mathematics in society
Numeracy in context	Multiple sub-themes
ICT capabilities	

YEAR LEVEL RANGE: *For actual target year levels per session see session descriptions.*

Rooms 1, 2, 6, 7	Foundation to Year 8
Rooms 3,4,8,9	Year 7 to Year 12
Rooms 5, 10	Misc levels

Time	Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8	Room 9	Room 10
1pm-1.45pm	Lunch break and networking function									
1.45pm-2.30pm	Unlock student engagement through scaffolded mathematical reasoning <i>Joel Townsend</i>	Introducing students to computational/algorithmic thinking -how computers think differently from humans - through five number sorting activities <i>Sebastian Sardina, Max Stephens</i>	Problem solving through creative explorations and investigations <i>Bozenna Graham</i>	Exploring infectious disease models with handshakes <i>Anthony Morphet</i>	The IB approach to mathematics that every educator can use. <i>Katrina Mooney</i>	Maths in schools should be like a good spag bol! <i>Lauren Lamont</i>	Practising your way to mastery <i>Anthony Harradine</i>	Successfully differentiating maths lessons to address gaps in understanding using low-floor, high-ceiling problems <i>Alex Blanksby, Thomas Christiansen</i>	Why are the fonts all different? Writing assessments that look professional. <i>Ewan Campbell, Laura Gilbert</i>	Engage in STEM learning with PYTHON <i>Sanjeev Meston</i>
2.30pm-2.40pm	Coffee break									
2.40pm-3.25pm	ABC of activities to include in junior secondary classrooms <i>Shelley Pendlebury</i>	Addressing the capabilities through contextual problem posing <i>Kate Eastcott</i>	Using effective starters, closers and reflections to enhance critical and creative thinking and student voice <i>Mark Collins, Samantha Horrocks</i>	Enhancing student engagement through inquiry-based learning and valuing mathematics in society. <i>Penelope Kalogeropoulos, Angela Liyanage</i>	The 3 E's - an elegant thinking routine? <i>Kathy Harrison</i>	Critical thinking in primary mathematics classrooms <i>Peter Stowasser</i>	Edrolo for Year 7 mathematics: deep engagement and meaningful learning <i>Laura Dortmans</i>	So: you now teach maths - what now? <i>Peter Collins</i>	Real trigonometry using real-time real-world data <i>Enzo Vozzo</i>	Worthwhile CAS calculator use in this year's Mathematical Methods exam 2 <i>Kevin McMenamin</i>
3.30pm	Close of conference									

SESSION DETAILS THURSDAY 2 DECEMBER 2021

KEYNOTES: Thursday, 9.15am-10.15am

ELICITING CRITICAL THINKING THROUGH THE USE OF SEQUENCES OF CONNECTED CUMULATIVE CHALLENGING TASKS.

(Capability development in students)

Sharyn Livy, Monash University
(F to Year 2)

Robust critical and creative thinking is crucial in both the teaching and learning of mathematics, when used effectively it can facilitate deeper thinking and reasoning. In this keynote presentation Sharyn will share findings from her research describing pedagogical practices that teachers use to guide student thinking through the use of sequences of connected cumulative challenging tasks. She will present a model for student-centred inquiry learning experiences that support students to justify their strategies and critical thinking skills. Examples of tasks for engaging Early Years students in critical and creative thinking experiences will also be shared.

ENACTING INTERCULTURAL CAPABILITIES THROUGH EARLY ALGEBRAIC THINKING

(Valuing Mathematics In Society)

Jodie Miller, The University of Queensland
(Year 3 to Year 6)

Teaching in ways responsive to the cultures of our students is vital towards enhancing equity of access to mathematics achievement and putting educational policy and curriculum into practice. So how can we achieve this in our mathematics classrooms? This presentation focuses on an approach to enhancing intercultural capabilities in mathematics through early algebraic thinking. Algebra is often thought to be a topic introduced to secondary school students. In fact, early lessons in algebraic thinking establish important foundations that prepare students for success in mathematics in the later years of schooling. For this reason, the Australian and Victorian curricula take a longitudinal approach to developing algebraic concepts, with knowledge and skills spanning Foundation to Year 12. In the primary years teachers and students explore tasks involving: generalised arithmetic; patterning; equivalence, equations, and expressions; and functions. Simultaneously, mathematical processes are being developed, including: representations, generalisations, justification and reasoning. These processes are often embedded in the curriculum capabilities. However, tasks are often designed as 'culture free' and designing and implementing learning tasks that draw on students' cultural backgrounds can be

challenging. In this keynote presentation Jodie will share learning tasks designed to enact intercultural capabilities that develop and sustain young culturally diverse learners' natural curiosity about number, patterns and relationships.

PANEL: THE CAPABILITIES IN MATHEMATICS AS A VEHICLE TO PREPARE STUDENTS FOR THEIR PROFESSIONAL, PERSONAL AND CIVIC LIVES

(Capability development in students, Valuing mathematics in society, Workplace capabilities)

Claire Delaney, Lalor Secondary College
Fernando Ianni, Roxburgh College
Kylie Slaney, Carey Grammar
Dave Tout, ACER
(Year 7 to Year 12)

Students are going to leave school to more uncertain world than any of us could have imagined. It is our responsibility as educators to contribute to their preparedness for the challenges that lie ahead. How do we best achieve this using the capabilities as a foundation for learning in secondary mathematics? What skills are the most important? How for example do Critical and Creative Thinking, Personal and Social capabilities and Numeracy remain front and centre, as we improve students' mathematics skills and knowledge? Let's hear why this is so important, what evidence tells us, learn explore how we can all move forward to ensure our students are prepared for their professional, personal and civic lives.

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

TEACHING IN ACTION: USING PROBLEM BASED LESSONS TO DEVELOP STUDENT CAPABILITIES IN MATHEMATICS

(Capability development in students)

Ashleigh Koo, Victoria University Secondary College
Tom Moore, EngageME Mathematics
(Year 7 to Year 12)

Have you ever been to a workshop or presentation and asked 'but what does it look like in the classroom?' If so, then this is the keynote for you!

In this unique and entertaining presentation, Ashleigh will give us front row seats to all of the action happening within her class. In doing so, the presenters will explore how Ashleigh uses a Problem Based Lesson (PBL) framework to develop the capabilities within her students. Using Smith & Steins' (2018) book: *5 Practices for Orchestrating Productive Mathematics Discussions*, Thomas and Ashleigh will then explore how the steps of 'anticipating', 'monitoring', 'selecting', 'sequencing' and 'connecting' can be used to enhance students' critical & creative thinking, and personal & social learning.

This presentation is guaranteed to have all of the highlights, action packed replays and one-on-one interviews that you might hope for when reflecting on one's performance.

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BUILDING THINKING CLASSROOMS

(Capability development in students)

Peter Liljedahl, Simon Fraser University
All Levels

Much of how classrooms look and much of what happens in them today is guided by institutional norms laid down at the inception of an industrial-age model of public education. These norms have enabled a culture of teaching and learning that is often devoid of student thinking. In this session Peter will present some of the results of over 15 years of research into how teachers can transform their classrooms from a space where students mimic to where students think. The practices discussed will intertwine with, and make extensive references to, the recently published book, *Building Thinking Classrooms in Mathematics (Grades K-12): 14 Teaching Practices for Enhancing Learning*.

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SESSION 1: Thursday, 10.25am-11.10am

PLANNING TO MAXIMISE NUMBER

(Numeracy in context)

Cassandra Lowry, St Francis of Assisi
(F to Year 2)

Schools are busy places. Sometimes the amount of content to be covered in Mathematics seems overwhelming and despite our best efforts students do not seem to be able to retain key concepts. How can we help students to develop their number knowledge while at the same time develop the skills and conceptual understanding they need to apply this learning in a wider context? This workshop will aim to overcome this challenge. Participants will be shown redeveloped overviews, planners, checklists and assessment strategies that aim to strengthen students' knowledge of number concepts while at the same time ensuring the development of broader problem solving and communications skills.

USING CULTURAL ARTEFACTS TO EXPLORE GEOMETRY CONCEPTS

(Capability development in students)

Kate Copping, Carmel Mesiti, Cath Pearn, The University of Melbourne
(F to Year 6)

Cultural artefacts provide rich visual stimuli for investigating geometry concepts in primary schools. Patterns of lines and shape found in decorative quilts, vases, wall hangings, and buildings, which can be used to investigate concepts such as 2D shapes, angles, translations and transformations. This session will focus on incorporating the intercultural capability and critical and creative thinking into the teaching of geometry concepts. Participants in this session will explore geometry activities using cultural artefacts to support the development of content knowledge and conceptual understanding.

UTILISING TEXTBOOK-BASED QUESTIONS TO PROMOTE STUDENTS' CAPABILITY OF THINKING BEYOND PROCEDURES

(Capability development in students)

Jiqing Sun, Deakin University
Echo Gu, Lauriston Girls' School
(Year 7 to Year 12)

Fostering students' deep thinking beyond memorising procedures is well discussed in mathematics education, but it could be challenging for everyday teachers' practice. One

reason could be the lack of purposefully designed resources. On the other hand, the exercise questions in textbooks might be one of the most accessible teaching resources for teachers. However, the textbook exercise is usually used for drill practice to familiarise students with learnt procedures. In this report, by showcasing how some textbook-based exercise questions (even exercises with 'Fluency' strand) can be utilised to spark students' discussion, hence promoting students' capabilities of thinking conceptually, the presenters would like to encourage classroom teachers to discover and use the 'power' of textbook questions that are very accessible in teachers' daily practice.

2020 MATHEMATICAL METHODS EXAMINATIONS

(Capability development in students, ICT capabilities)

Allason McNamara, Trinity Grammar School
Rod Watson,
(Year 11 to Year 12)

Allason and Rod will do a similar session to the 2021 MAV Meet the Examiners Lecture for Mathematical Methods. They will discuss common errors that students made on the 2020 examinations. Rod will talk about Exam 1 and Allason Exam 2. The statistics for each question will also be shown.

DRIVING YOUR OWN BRAIN: METACOGNITION IN MATHEMATICS

(Capability development in students)

Lyn Coote, Corwin Australia
(F to Year 10)

Metacognition enables learners to become aware of how they learn and to evaluate and adapt these skills to become increasingly effective at learning. How does this look in mathematics? How can we deliberately and explicitly teach metacognitive strategies? You will leave this session with information about metacognitive strategies and practical ways they can be implemented in your mathematics classes. Participants will experience strategies and have opportunities to collaborate with others, testing out some of the strategies, as we delve into handing over the wheel to our learners through metacognition.

SESSION 1: Thursday, 10.25am-11.10am (cont.)

IMPROVING MATHEMATICS OUTCOMES OF FIRST NATIONS AUSTRALIAN LEARNERS THROUGH CULTURALLY RESPONSIVE PEDAGOGY AND CURRICULUM

(Capability development in students, Numeracy in context, Valuing mathematics in society)

Caty Morris – ATSIMA
(F to Year 8)

First Nations Australian students, on average, remain at least 2 years behind non-Indigenous students in mathematics learning outcomes. This presentation will provide an overview of the Aboriginal and Torres Strait Islander Mathematics Alliance's (ATSIMA) action to redress this, including classroom examples from ATSIMA's current project with the Connected Community schools in NSW, and recent work with ACARA in developing over 100 content elaborations in Aboriginal and Torres Strait Islander histories and cultures for the Australian Curriculum: Mathematics. Participants will get a first-hand look at the rich contexts, numeracies, and mathematics themes that underpin these elaborations and the narratives they weave throughout the 6 mathematics strands and Years F-10.

This session will focus on examples from F to Year 8.

WHAT DOES IT REALLY MEAN TO THINK MATHEMATICALLY?

(Capability development in students)

Ellen Corovic, Monash University
(F to Year 6)

In this session Ellen will outline the three skills students need to act and think mathematically. Thinking mathematically has been a concept of mathematics teaching for some time. But what is it? How do we break it down and what are students actually doing when they are doing it? Combining her experience and research Ellen will provide practical teaching advice to help you to get students thinking.

NEW TEACHER SERIES - PART 1: EFFECTIVE AND POWERFUL PEDAGOGICAL APPROACHES. [THRIVE IN YOUR FIRST 5 YEARS OF TEACHING!]

(Capability development in students, Numeracy in context)

Danijela Draskovic, The Mathematical Association of Victoria
(Year 7 to Year 12)

Important: This is part 1 of a special 3-part series aimed to assist new teachers in navigating their first five years in the classroom. (Part 1 and 2 will be presented during the conference with Part 3 as a bonus presentation to watch later) You do not have to register for Part 1 and 2, however, to get the most out of the series, Part 1 and 2 should be attended on the day. (Part 3 will be available as a recorded video).

It has been well publicised that a significant percentage (up to 50%) of graduate teachers leave the profession before they have reached the milestone of five years of teaching. With the balance of classroom management and establishing relationships with key stakeholders, managing workload, and ensuring your curriculum planning caters to varying abilities and linked to assessment data, there is no doubt graduate teachers can feel overwhelmed.

In this first part of the 3-part Series, we will share and unpack engaging warmups/games, and look at the powerful pedagogical approach of starting with a problem students want to solve. We will discuss how to effectively weave all four proficiencies (understanding, fluency, problem solving and reasoning) into our practice. The work of Professor Peter Sullivan is the main inspiration for this session.

USING COMPUTERS IN A MATHS CLASSROOM AND HOME LEARNING WITH YEAR 11/12+ STUDENTS

(Capability development in students, Numeracy in context, Valuing mathematics in society, Workplace capabilities)

Robert Rook, mathplotplus
(Year 11 to Year 12)

All participants will receive a free site license for their school of the latest software. Among the topics covered are graphing, calculus, consumer maths, complex numbers, distributions, functions, parametric and polar graphs, regression, statistics (junior & senior), modelling data, trigonometry, probability and vectors to name a few. Generation of various 2D and 3D equations including above topics plus 3D planes, surfaces, tori, knots, solids of revolution. Use of the senior worksheet generator (Year 12), topic revision/test program (now producing questions in 23 different languages with options for displaying questions in English and/or another language to assist in home learning), homework book generator will be explained. Questions are randomly generated giving an infinite number of questions with not only answers but full solutions available for questions. Demonstration on emailing of student work, students can load saved questions from a pdf file whether generated by themselves or sent from teacher and add their solutions to the pdf files and email back to teachers. All pdf editing is within the program itself. Robert is the author of the program, ex maths teacher, conducted inservices in over 3500 secondary schools and universities and conducted approximately 400 sessions at maths conferences worldwide.

MATHEMATICAL ENTREES - REASONING STARTERS

(Capability development in students)

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

We've probably all been to one of those fancy events where they bring out little canapés to snack on while you wait for the main course. For some of us these entrées become the main course as we follow our favourite hors d'oeuvre around the room claiming, "they're for a friend" to the waiter who looks at you suspiciously!

Mathematical entrees are designed to whet your learner's appetite and get them excited for what's to come, generate rich mathematical reasoning or even become the main lesson when you see how engaged your learners are.

In this session we will playfully explore a range of mathematical entrees and learn to design our own.

SESSION 2: Thursday, 11.20am-12.05pm

TEACHER PLANNING - TIME FOR A CHANGE?

(Capability development in students, Numeracy in context)

Susan Graham, St Therese's School
Jane Hubbard, Melbourne Archdiocese Catholic Schools
(F to Year 2)

Challenging tasks encourage students to solve non-routine problems and develop reasoning skills through rich classroom experiences to promote connectedness and transferability across contexts. Effective implementation of challenging tasks supports students in the development of critical and creative thinking and social and emotional capability whilst promoting mathematics learning as a relevant and worthy endeavour.

A key challenge for Foundation to Year 2 teachers who use a student-centred approach is identifying ways to overcome the gap between students' prior knowledge and the intended mathematics goal of the lesson without relying on the traditional modes of instruction. In this session, we will present our experiences, as we support teachers to plan and implement challenging tasks as part of their mathematics programs. We will discuss some of the challenges that we have overcome throughout the process and reflect on our learning about planning for challenging tasks in mathematics.

From this session, teachers will be able to:

- gain an insight into an effective planning framework to support teachers with anticipating responses to challenging tasks
- identify effective questions to support the various learning pathways that occur throughout a lesson

WHAT'S THE BIG IDEA?

(Capability development in students, Numeracy in context)

Michael Minas, Love Maths
(F to Year 6)

One of the issues facing educators is a crowded curriculum, and there is perhaps no subject where this is more evident than in mathematics. So how do we prioritise which elements of the curriculum to emphasize? What are the key aspects of mathematics that students need to focus on to ensure that their long-term progress is not adversely impacted? And how can teachers make meaningful connections across content strands, to help students develop a relational understanding of mathematics?

This workshop will explore the big ideas of the curriculum- what they are, why they are important, and how to ensure your school is planning to teach them properly.

PROBLEMS WORTH CODING - EPISODE IV

(ICT capabilities, Valuing mathematics in society, Workplace capabilities)

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

Marty McFly, Max Rockatansky, John McClane and Ellen Ripley did it, now it's my turn! The *Problems Worth Coding* franchise kicked off in 2016. Episodes I, II and III explored numerous great problems, definitely worth revisiting, but many more challenges lie ahead for those willing to digitise their thinking. From creating functioning barcodes to flying, the mathematical and physical world come together through coding. Participants will not be writing programs, instead, they will be given great mathematics problems to investigate and provided with the structures and basis of the code need to enable such explorations.

2020 SPECIALIST MATHEMATICS EXAMINATIONS

(Capability development in students, ICT capabilities)

Dean Lamson, Kardinia International College
Allason McNamara, Trinity Grammar School
(Year 11 to Year 12)

Allason and Dean will discuss the process for setting and marking the 2020 Specialist Mathematics VCAA examinations. They will provide a full analysis of the 2020 examinations, highlighting student responses and key misunderstandings, commenting on some of the questions in relation to these. There will be time for questions and discussion.

TEACHING MIDDLE SCHOOL MATHS FOR CONCEPTUAL UNDERSTANDING

(Capability development in students, Numeracy in context)

Nadia Abdelal, eXpanding Minds Mathematics Consulting
(Year 5 to Year 10)

Engaging students in maths at the middle school level can often be difficult. Many students can hit roadblocks during this critical stage of their mathematical development and as a result, lose the ability to connect with some of the higher-order skills. This hands-on workshop will focus on conceptual ways to teach some of the more abstract concepts like fractions, decimals, algebra, and geometry so that students can more easily access the pure maths involved in tackling problems associated with these concepts.

USING REASONING TO DEVELOP DEEP UNDERSTANDING

(Capability development in students)

Michael Nelson, Drysdale Primary School
(Year 3 to Year 6)

This presentation will explore how the reasoning and understanding capabilities are linked and can be used together to develop best practice in the classroom. This presentation will investigate how teachers and educators can increase their students reasoning and how by focusing on this, a deeper understanding of concepts will be developed. This will involve exploring explicit teaching, small group approaches, lesson activities and assessment tools to create a rich environment for students.

STATISTICS AND PROBABILITY NUMBER TALKS

(Numeracy In Context)

Catherine Epstein/Rodgers, Maths Consultant
(F to Year 6)

Number Talks provide a rich opportunity for all students to engage in mathematics by encouraging the students to think flexibly about numbers. But why not extend this flexible thinking across the strands!

By providing rich prompts or probing questions we can ignite the spark to encourage flexible thinking and reasoning when looking at Statistics and probability.

Together we will use visual prompts and data from games to explore Stats and probability in an analytical and collaborative way thus encouraging flexible thinking and promoting understanding.

NEW TEACHER SERIES - PART 2: EFFECTIVE USE OF ICT. OUR FAVOURITE DIGITAL TOOLS. [THRIVE IN YOUR FIRST 5 YEARS OF TEACHING!]

(ICT capabilities)

Danijela Draskovic, The Mathematical Association of Victoria
(Year 7 to Year 12)

Important: This is part 2 of a special 3-part series aimed to assist new teachers in navigating their first five years in the classroom. If you missed Part 1, don't worry as you will be able to watch it at a later stage. Part 3 is a bonus presentation which will be available after the conference.

It has been well publicised that a significant percentage (up to 50%) of graduate teachers leave the profession before they have reached the milestone of five years of teaching. With the balance of classroom management and establishing relationships with key stakeholders, managing workload, and ensuring your curriculum planning caters to varying abilities and linked to assessment data, there is no doubt graduate teachers can feel overwhelmed.

This 2nd part of the 3-part Series will showcase a selection of digital technologies I have deemed to be very useful and user friendly. These will include freely available software and maths apps which you can easily and readily use in your classrooms. We can leverage technology to help students visualise concepts, collect, model and analyse data, and help students

SESSION 2: Thursday, 11.20am-12.05pm (cont.)

stay connected to a safe community of learners. Technology can be one of your greatest teaching tools. No doubt since we have done quite a bit of remote-teaching and learning as of late, we have all been forced into considering the way we use our ICT. This session will provide opportunities to share those experiences, and share your personal favourites.

THE NEW VCE FOUNDATION MATHS: ENHANCING STUDENT CAPABILITIES IN MATHEMATICS FOR USE IN EVERYDAY LIFE, FUTURE STUDY AND WORK

(Capability development in students, Numeracy In Context, Valuing Mathematics In Society, Workplace Capabilities)

Justine Sakurai, Sandringham College and Educational Consultant
Dave Tout, Australian Council for Educational Research (ACER)
(Year 11 to Year 12)

The new 2023 version of VCE Foundation mathematics includes the ability for students to study this mathematics subject for the first time in Year 12 through the development of Units 3 and 4. This presentation will outline the new VCE Foundation Maths curriculum that was reviewed and revised over 2019/20, and finalised after public consultations in 2021. This session will share some of the insights, background and content of this revised and new curriculum and how it can be used to better support more students gain improved capabilities in mathematics understanding and use.

AREA (AND HOW TO USE IT TO TEACH THE ENTIRE CURRICULUM)

(Capability development in students, ICT capabilities, Numeracy in context)

Chris Wetherell, AMT
(Year 5 to Year 12)

Well, maybe teaching the entire curriculum is the slightest exaggeration. But there are connections everywhere in mathematics, so it should not be surprising that an idea as fundamental as area should find natural links with such diverse topics as fractions, algebra, probability, statistics and calculus. Of course, all of these topics can be applied to solve various problems about area, but in this workshop we will mainly be interested in the reverse process of harnessing an intuitive grasp of area to help develop a deeper understanding of key concepts in other parts of the curriculum.



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SESSION 3: Thursday, 12.15pm-1pm

STUDENT VOICE AND AGENCY TO PROMOTE CRITICAL AND CREATIVE THINKERS IN THE MATHEMATICS CLASSROOM

(Capability development in students)

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

Student voice and agency allows students to have a level of autonomy and power in a learning environment as well as promote critical and creative thinking. Learning and teaching beliefs, classroom environment and the choice of Mathematical tasks are paramount. Through the use of Maths Talks and Challenging Maths Tasks learn how students have become independent self regulated, critical and creative thinkers in a primary setting. This hands-on workshop will offer tasks, look at student work samples and videos, as well as provide guides and protocols to assist in setting up a classroom that honours student agency that promotes critical and creative thinking.

TRANSFORMING THE MATHS EXPERIENCE - A COMMUNITY LEARNING PROJECT

(Capability development in students , Numeracy in context , Valuing mathematics in society)

Alex Box, The Math Collective
(F to Year 6)

There is still a real need to engage learners both cognitively and emotionally in the mathematics they learn. How can we help young learners leverage their creativity and desire to help others, in a way that can transform their own mathematical experience and that of others in their community?

This session is a dedicated focus on authentic learning experiences that allow learners to make a positive difference in the community by exploring, playing with, and learning maths. The mathematical proficiencies will play a starring role and an example unit, which can be adjusted to various contexts, will be shared.

STEM ACTIVITIES IN ASTRONOMY

(ICT capabilities , Numeracy in context , Valuing mathematics in society)

Stephen Broderick, St Ursula's College
(Year 7 to Year 10)

In this session, TI-Nspire Measurement Tools will be used to analyse astronomical images from the web including the use

of sunspots to determine the rotational period of the Sun and the period of the solar cycle. Trigonometric functions will be also used to predict the position of the Moons of Jupiter and determine the tilt of the Earth's axis. Other activities include using Google Earth to collect meteorite impact data. Free planetarium software such as Stellarium will also be used to verify predictions and collect data.

MEASUREMENT IN PRACTICAL CONTEXTS

(Capability development in students, Numeracy In Context, Workplace Capabilities)

Marj Horne and Rebecca Seah, RMIT
(Year 7 to Year 10)

Measurement and geometry are critical components of many practical STEM problems. In this session we will explore a series of problems set in the context of drink containers and engaging the concepts of length, area volume and capacity. The focus is on the relationships between the different concepts and units involved and the reasoning and associated problem solving and possibly extension investigation tasks. The session is aimed at middle school (Years 7-10).

WHAT'S THE PROBLEM WITH PROBLEM SOLVING?

(Capability development in students , Valuing mathematics in society , Workplace capabilities)

Janine Sprakel, AMT
(Year 3 to Year 10)

Most teachers would agree that problem solving in the mathematics classroom is important, but in reality finding the time and the resources to deliver it is tricky for many of us. In this session we will look at structuring a problem solving session, finding good problems for students to tackle and consider how to introduce strategies that students can make their own. We will also dive into what problem solving IS, how it relates to the world outside the classroom and have a conversation about the conditions and the support you need to help you implement problem solving in your classroom.

MY TOP 5 TIPS FOR RUNNING A SUCCESSFUL PARENT MATHS NIGHT: MATHS ADVOCACY IN ACTION

(Valuing mathematics in society)

Angela Rogers, RMIT University
(F to Year 6)

One of the (very few) positives to emerge from remote

learning, is society's 'newfound' interest in the way children learn mathematics. Our 'new' methods, strategies, language and resources, have caught the attention of many parents who were stuck in lockdown trying to support their children. I believe now, more than ever, parents are primed to learn practical ways to help their children in maths. Creating strong home-school links has benefits for everyone, but most of all, they can improve student achievement and promote the true value of maths in society. This session provides Numeracy Leaders with practical tips for planning and running an engaging maths evening for parents. You will walk away from this session with resources and ideas you can immediately implement with your school community in 2022.

TAKING TEACHER MATHS SUPPORT TO THE NEXT LEVEL

(Capability development in students , Numeracy in context)

Sophie Matta, Pearson Australia
(F to Year 2)

Pearson Mathology F-2 is a flexible teaching tool built on a research-based learning progression that is mapped to all Australian state curricula. It equips teachers to deliver hands-on lessons and formative assessment (using rubrics) through maths-first Little Books, table-top games and activities. Teacher support on planning, differentiation, assessment, and next steps is provided via a digital platform where teachers can also integrate their own favourite activities.

This session will demonstrate how teachers of all experience levels can use Mathology for support in teaching key maths concepts, identifying needs, and taking appropriate actions to progress their students' learning.

INTRODUCTION TO THE MATHEMATICS OF MACHINE LEARNING

(Capability development in students , ICT capabilities , Workplace capabilities)

Georgia Gouros, Georgia Gouros, Virtual School Victoria
(Year 9 to Year 12)

Machine learning is a type of Artificial Intelligence that uses real world input to learn how to perform advanced tasks that are difficult to create algorithms for such as recommender systems, identity fraud detection, weather forecasting and image/speech classification. Machine learning algorithms make use of calculus, probability and linear algebra.

In this session there is an introduction to some Machine Learning structures that can be used with simple examples for

your maths classroom:

- Perceptrons – binary separation for classification
- Decision Trees – predicting outcomes by recursive partitioning
- Naïve Bayes - Probabilistic classification

ENHANCING LEARNING OUTCOMES WITH CAS (TI-NSPIRE) IN MATHEMATICAL METHODS

(Capability development in students , ICT capabilities , Numeracy in context)

Sanjeev Meston, Firbank Grammar School
(Year 11 to Year 12)

This session will provide an opportunity for attendees to see and learn the power of TI-Nspire in the Methods class as a powerful teaching and learning tool. There are several features and aspects of the CAS that are not effectively utilised by both the teachers and the students and these will be showcased in this particular session. These are very effective and helpful to respond to Exam 2 questions. This session has always been very popular.

MATHSCRAFT - DOING MATHS LIKE A RESEARCH MATHEMATICIAN

(Capability development in students, Numeracy in context, ICT capabilities)

Anita Ponsaing, ACEMS, University of Adelaide
(Year 5 to Year 10)

To do maths you need:

- A question to think about
- Some prior knowledge and skills to think with, and
- At least one good idea.

One way to have a good idea is to have lots of ideas. Mathematicians work at having lots of ideas, and train themselves to recognise the good ones from the not-so-good ones. MathsCraft is a program that gives students the chance to experience this process for themselves - to do maths like a research mathematician. MathsCraft problems only require prior knowledge and skills the students are already operational with, and the environment is set to give them the best possible chance to have ideas.

This workshop will let you experience a MathsCraft session from the student's point of view. We will also cover some of the philosophy behind it, as well as information about the new MathsCraft Curriculum.

SESSION 4: Thursday, 1.45pm-2.30pm

IT'S A MATTER OF TIME

(Numeracy in context)

Judy Gregg and Carmel Delahunty, Independent Primary Maths Consultants
(F to Year 6)

Tick tock goes the clock! Learning about time is much more than just being able to read a clock. It is a difficult concept for students to grasp because it cannot be seen or felt. In addition to learning how to tell time, students need to have an awareness of time, an understanding of succession of time, and how to estimate and calculate elapsed time. This pursuit also covers aspects of the Victorian Science curriculum; exploring Earth's rotation, revolution and phases of the moon enhances students' understanding of time measurement units.

This workshop will equip participants with a multitude of practical activities, that go beyond teaching students to read clocks. These experiences will be centred around four important areas: awareness of time, succession of time, elapsed time, measurement of time, and caters for students in years F-6.

ADDRESSING THE CAPABILITIES THROUGH CONTEXTUAL PROBLEM POSING

(Numeracy in context, Valuing mathematics in society)

Kate Eastcott
(F to Year 6)

Contextual problem-posing, or the generation of problems about a purposeful or relevant context, allows teachers and students to practice mathematics in a more meaningful way.

In this workshop teachers and leaders are invited to consider how engaging students in contextual problem-posing can provide opportunities to develop the capabilities, while deepening their mathematical understanding, increasing their enjoyment of mathematics, and building confidence in their mathematical abilities. We will explore how contextual problem-posing can address the key ideas of the capabilities, as well as how it can influence students to become mathematically minded individuals.

PROMOTING NUMERACY ACROSS THE SECONDARY CURRICULUM

(Numeracy in context)

Helen Forgasz, Gillian Kidman and Jennifer Hall, Monash University
(Year 7 to Year 10)

In the Australian Curriculum, numeracy is one of the seven general capabilities. In the Victorian Curriculum, "the knowledge and skills that underpin numeracy are explicitly taught in the Mathematics strands... and reinforced and further exemplified in and across other curriculum areas." Mathematics teachers therefore have a role to play in supporting their colleagues to incorporate numeracy in all subject areas. In this presentation, we will share exemplar lessons for Levels 7-10 that were specifically designed to be consistent with the learning areas of the Victorian Curriculum. For example, a Health and Physical Education lesson for Levels 7/8 involves exploring the numeric data provided on snack food packages to determine the nutritional value of the foods, whereas a History lesson for Levels 9/10 involves analysing statistical data to understand the human costs of the 'Spanish' Flu (1918-1920) in Victoria. In addition to sharing the exemplars, we will introduce participants to the 21st Century Numeracy Model (Goos et al., 2014), which framed the development of the numeracy lessons.

CREATING AN ENGAGING MATHEMATICS CLASSROOM THROUGH PROGRAMMING

(ICT capabilities, Valuing mathematics in society)

Robin Wang, Preshil Secondary School
(Year 7 to Year 10)

The digital technologies curriculum is a new curriculum area which enables students to become the creators of innovative solutions in this digital era. This curriculum area provides students with practical opportunities to explore the tangible problems through the application of computational thinking and information systems. Computational and algorithmic thinking is an essential component in this curriculum area and usually placed in the mathematics subject. However, it is observed that while students are equipped with programming skills through the unit, the integration and adoption of computational and algorithmic thinking in the mathematics class is not evident. In this talk, a sequence of lessons is proposed for computational and algorithmic thinking. Three mathematics topics: pattern, sequence, probability are explored through programming. Multiple problems and activities in each topic are presented. The computational

and algorithmic thinking in the solution process is interpreted by flowcharts. At the end of this talk, an easy-to-learn programming language – Python, is reviewed. Some helpful data types and modules in Python are demonstrated with examples. Programming fosters logic, creativity and problem solving. The beauty of mathematics resides in pattern, reasoning and proof. The aim of this talk is to investigate the synergy between programming and mathematics, hence help mathematics teachers create an engaging learning environment in their classes.

HOW TO MAKE GEOGEBRA A LEARNING TOOL FOR STUDENTS.

(Capability development in students, ICT capabilities)

Narcisa Corcaci and Uyen Lavie Vo, Werribee Secondary College
(Year 7 to Year 12)

We see GeoGebra as an excellent open-source software that can bridge the gap between hands-on activities and abstract thinking. We have noticed that when GeoGebra is used as a teaching tool, students feel empowered to make appropriate use of technology and be creative. Their understanding significantly improves. GeoGebra easily becomes a tool for students to check their own thinking and learning. In this workshop, we will present some simple GeoGebra activities, and demonstrate formulae and theorems from the Measurement and Geometry strands. These activities are suitable for years 7-12 students.

SHARING THE LOVE: TIPS FOR HAVING YOUR IDEAS PUBLISHED.

(Valuing mathematics in society)

Angela Rogers, RMIT University
(F to Year 6)

Do you love reading maths blogs, online articles or journals about maths? Do you wonder if you could one day share your ideas? Do you have practical ideas/tips that could help other Primary or Early Childhood maths teachers or leaders? Do you have resources (books, games) you love and would like to share? Do you want to develop your profile in the maths education world? If you have answered 'yes' to any of these questions... come along to this session where *Prime Number* editor Angela Rogers takes you through the simple (and enjoyable) process of writing articles and the benefits being 'published' can have for your career. (Tip: you don't have to be an 'expert' to do this!)

TAKING MATHEMATICS OUT OF THE CLASSROOM

(Capability development in students)

Kristen Westcott, NSW Department of Education
(F to Year 6)

In 2019 Kristen read a Twitter post of a simple maths problem that she thought kids would enjoy... but Kristen didn't have a class to try it out with. She did, however, have a window in her office and posted the problem there. It was the birth of the Maths Challenge Wall.

Two years later it has grown and students from Years 2 – 6 regularly spend break times trying to solve the range of puzzles, problems and challenges.

The challenge wall has had a positive impact on mathematical dispositions across the school and many elements of the Critical and Creative Thinking as well as Personal and Social capabilities are played out at the wall on a daily basis.

This presentation will explore how the wall was developed in her school as well as examples from other schools who have followed her lead. Participants will have the opportunity to explore the types of challenges that have been presented to date and to recommend their ideas for others to try.

USING MATHEMATICS TO DRIVE FUTURE-FOCUSED FINANCIAL CAPABILITY

(Capability development in students, Numeracy In Context)

Jill Brown and Carly Sawatzki, Deakin University
(Year 7 to Year 10)

Mathematics lessons that explore financial trends, problems and issues help students to develop economic and mathematical understandings, and these understandings contribute to financial capability. In this presentation, Carly and Jill will share stories arising from the Economics + Maths = Financial Capability research project. They will present ways to mathematise young people's experiences buying fast fashion, and recycling and upcycling clothing. They will leave you feeling inspired to develop future-focused financial capability at your school, because it's good for your bank balance, your community and the planet.

SESSION 4: Thursday, 1.45pm-2.30pm (cont.)

MATHEMATICAL INVESTIGATIONS FOR THE NEW VCE STRUCTURE

(Capability development in students , ICT capabilities)

Brian Lannen, Murray Mathematics Curriculum Services
(Year 11 to Year 12)

A new study design is currently being developed for VCE Mathematics for the next decade. The notion of “Mathematical Investigation” is featuring in this. Exactly what does this mean and how could we shape it? This session examines what may and may not be desirable in mathematical investigation, whether it be a process or a project. Various resource gateways will be shared, along with a few specific projects that could have a curriculum fit as part of either the calculus or non-calculus VCE courses. Have your TI-Nspire CX (CAS) calculator (or equivalent) at hand.

BUILDING A COMMUNITY OF MATHEMATICIANS

(Capability development in students , Valuing mathematics in society , Workplace capabilities)

Alex Fox, Kathy Harrison and Jeff Segal,
Virtual School Victoria
(Year 5 to Year 10)

In this session, we will demonstrate and model what we value in our community of mathematicians. How can you approach building a community where teachers and students feel valued, engaged, adequately challenged, and confident to take risks? Our context is online, and our cohort is made up of highly-able middle school students. This adds a layer of complexity to the way in which we construct community. Everything we do needs to be intentional.

Doing maths together is the cornerstone of our practice. Low floor, no ceiling (the sky's the limit) allows all to be engaged at their level. In this session we will share the way we approach curriculum design and delivery. By engaging with a typical activity, participants will experience the rabbit-holes, curiosity and questioning that drives our practice.

This session will address all the capabilities through problem solving and problem finding. It will provide insight into how teachers can support students to think like mathematicians while building a mathematical community.

We welcome teachers who would like to encourage students to take problems as far as they can go, and beyond.

SESSION 5: Thursday, 2.40pm-3.25pm

RICH MATHEMATICAL CONNECTIONS

(Capability development in students , Numeracy in context , Valuing mathematics in society)

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

This workshop will help teachers to develop engaging, differentiated ways to teach units of mathematics. We will look into using connections to the world, picture story books and provocations to spark students inquiry into the learning of mathematics. To have all students walk out of your maths lesson being happy that they were challenged and being totally ok with that is something all students should be given the opportunity to experience.

In this workshop, you will take away tools to improve the mathematical mindsets and learning of all of your students.

MAKING MATHS FUN THROUGH CONTEXTS

(Numeracy in context)

Bernard Kerrins, St Francis of the Fields Primary School
(F to Year 6)

Teaching can be difficult at the best of times. It can be much harder when the students are disengaged and cannot see the purpose behind what we are asking them to do. Why is this so? Students respond better when there is a reason to be engaged, and this comes through providing them with meaningful learning experiences that are supported and generated through rich contexts. So often we adhere strictly to long held strategies, beliefs and practices that over time become stale, yet we persevere with them because we lack the knowledge, experience, motivation or support to try something different.

This workshop looks at ways to identify these contexts across all primary levels, and then to create learning experiences that will generate greater motivation for the students (and teachers) to be more involved in the lessons.

We will identify the passions that we and the students have, and use these as a way to create hooks that will engage the children and help teachers to create greater intent and purpose in their teaching. It is about motivating teachers just as much as students!

This workshop will show how to cover all areas of the maths curriculum from P-6, and is also effective for the Secondary level.

It will be just as valuable to the highly motivated teacher as it will be to the teacher who really needs support and guidance in creating more meaningful learning experiences.

IMAGINE IF ALL OUR STUDENTS CONSIDERED THEMSELVES ‘MATHS PEOPLE’

(Capability development in students)

Lindy Bayles, Julian Lumb, Pearson
(Year 7 to Year 10)

Set a pre-quiz from Pearson Diagnostic and the sophisticated algorithms will determine each learner's initial level of understanding. From there each student will be assigned targeted activities aimed at their level of understanding which provide opportunities to learn and upskill through teacher led tasks with a focus on critical thinking.

In this presentation we will demonstrate how simple it is to accurately diagnose a student's level of understanding and how the simple task of creating and drawing arrays paves the way from counting, repeated addition, multiplicative thinking, area model to expanding binomials and understanding perfect squares, sums and differences.

This is a commercial presentation.

HOW RISKY IS LIFE?

(Capability development in students, Numeracy In Context, Valuing Mathematics In Society, Workplace Capabilities)

Kaye Stacey, The University of Melbourne
(Year 7 to Year 10)

Making assessments of risk has been a major theme of 2021, as individuals, workplaces, and the media have grappled with how to manage life with COVID. We now more fully appreciate how assessing probabilities and making decision about risk is an important part of numeracy. This session will give an outline of and show some of the student activities in How Risky is Life?, a unit in the Special Topic “Mathematical Modelling” of the reSolve Maths by Inquiry project (download from <https://www.resolve.edu.au/mathematical-modelling>).

Students explore the statistical modelling of risk (involving both probability and hazard), with a focus on the interpretation of data and evaluation of the inferences drawn from it. The goal is to develop students' ability to think independently, and to develop a realistic assessment of risk and an informed scepticism about dramatic claims.

SESSION 5: Thursday, 2.40pm-3.25pm (cont.)

Using Australian Bureau of Statistics data, students consider risk in everyday life by investigating the relative probabilities of various causes of death - unnatural and natural - including terrorism, disease and accidents of various kinds. They consider how factors such as age affect the data, and discuss the usefulness of the model to predict a particular person's future. They practise looking at data sensibly, seeing the story presented in a direct reading of the data but then looking through it make more sophisticated interpretations. Teachers will recognise that these issues need to be handled sensitively, but addressing these abilities is essential to numeracy for life and for work.

Note: Participants may wish to download the teaching materials for this unit before the session (free download). It contains 5 lesson plans, all student resources, and special purpose software.

SPIRALLING THROUGH THE SURDS

(ICT capabilities , Numeracy in context)

**Roger Wander, The University of Melbourne
(Year 7 to Year 12)**

Here's an activity where the visual simplicity and beauty of the Pythagorean spiral can be created by all of your students, equipped with just a pencil and ruler. But give them the technology of a CAS-enabled spreadsheet and all the square-root surds within the spiral will come to life. In this presentation you'll see how your students can use numerical patterns to understand, pose and answer questions about their geometric artwork. How many triangles do you need before they start to overlap? Or reach the edge of your paper? Which triangle is 100 times as large as the first? TI-Nspire CAS software will be used to explore this wonderful merger of hand- and technology-produced art.

DEVELOPING MATHS CONCEPTS WITH RECEIPT ROLL AND NUMBER LINES

(Capability development in students, Numeracy in context)

**Tierney Kennedy, Kennedy Press
(Year 3 to Year 8)**

In this workshop, we will explore using the Number Line strategy for developing numeracy capability through the use of flexible strategies. Teachers will explore how to use receipt roll to develop connections between:

- Measurement: length (including perimeter), capacity and unit conversion

- Place Value
- Money
- Addition and subtraction (including with integers)
- Conversion between fractions, decimals and percentage
- Probability
- Pie charts and bar graphs
- Ratio and scales
- Multi-step worded problems and simple algebraic equations

This workshop is designed for teachers from Years 2-9, however others are welcome to join in.

NBA MATH HOOPS

(Capability development in students , Numeracy in context , Valuing mathematics in society)

**Nick Devereux, The Huddle
(Year 3 to Year 8)**

The Huddle, in partnership with Learn Fresh, is bringing NBA Math Hoops down under, into Victorian classrooms. NBA Math Hoops is a physical and digital board game and curriculum that engages primary and secondary students in fundamental mathematics through the game of basketball. Working with real NBA and WNBA player statistics, students complete a 10-lesson series while playing the NBA Math Hoops game to practice skills and improve fluency. All program content is aligned to the Victorian Curriculum.

Math has never been this much fun! Check out the presentation to learn more and register for 2022, spots are limited, and it's FREE.

TO CAS OR NOT TO CAS?

(ICT capabilities)

**Chris Ireson, Melbourne High School
(Year 11 to Year 12)**

Now, that is a great question! When should you use your CAS Calculator in the exam? Your student comments, 'I'm all set for the MM Exam 2 with my bound reference. So, what's this I hear about Widgets on the TI-Nspire?' Discover how easy it is to create interactive documents on the TI-Nspire CX CAS Calculator using the Notes and Graph Applications. These documents can be used for teaching concepts to engage students in Mathematical Methods Units 1-4 and also be used to save time in examinations. Come and see examples of documents that are being created and used in the classroom.

Note: Access to the TI-Nspire™ CX CAS Premium Teacher Software or the TI-Nspire™ CX or CX II CAS Calculator is required to gain full value from this presentation. No prior experience assumed. The Casio ClassPad is not appropriate for this session.

ON WRITING A MATHEMATICS ASSESSMENT FOR LEARNING

(Capability development in students)

**Paul Allsopp, Carey Baptist Grammar School
Robin Wang, Preshil Secondary School
(Year 7 to Year 10)**

Across middle year levels (year 7-10) tests and exams have been dominating in the mathematics subject as it is an efficient way to measure students' knowledge and understanding of concepts in each unit. But should we, mathematics teachers, consider different ways to design a summative assessment? In this talk, criteria based summative assessment borrowed from IB MYP (International Baccalaureate Middle Year Program) is explored. Four criteria: knowing and understanding, investigating patterns, communicating and applying mathematics in real-life contexts are explained with assessment. At the end of this talk, theory of knowledge (TOK) is introduced. Theory of knowledge is an essential ingredient which underpins the philosophical and ideological framework of the International Baccalaureate. It explores the different ways of knowing across many academic disciplines.

SESSION DETAILS FRIDAY 3 DECEMBER 2021

KEYNOTES: Friday, 9.15am-10.15am

MATHEMATICAL THINKING IN THE EARLY YEARS: DEVELOPING CRITICAL AND CREATIVE THINKERS FOR OUR FUTURE!

(Capability development in students, Numeracy in context, Valuing mathematics in society)

Jennifer Bowden, The Mathematical Association of Victoria
(F to Year 2)

A new Australian Curriculum gives us the opportunity to provide students in the early years (Foundation to Year 2) a balance between laying a foundation of basic concepts, and essential opportunities where students can experience and develop their critical and creative thinking skills. Both elements are extremely important, and it is essential that this is reflected in our teaching and learning.

In her experience working with hundreds of early years teachers across Victoria, Jen has observed outstanding teaching and learning that demonstrates that both the basic numeracy and thinking can be integrated successfully. In this keynote Jen will share her observations outlining that there is no 'one size fits all' solution, however there are multiple outstanding examples of excellence that work. Jen will propose approaches for teaching and learning in mathematics in the early years to engage students, and ensure our students are prepared as critical and creative thinkers for our future.

MATHEMATICS IN A MULTI-AGE SETTING

(Capability development in students)

Toby Russo, Spensley Street Primary School
James Russo, Monash University
(Year 3 to Year 6)

An often noted challenge when teaching mathematics is catering to the diversity of students in a classroom. We would argue that facilitating learning experiences that aim to cater to students from Foundation (5 year olds) to Year Six (12 year olds) simultaneously represents an amplification of this challenge. Some relevant considerations include:

- What mathematical concepts are most appropriate to explore in a multi-age context?
- How might the learning be organised to allow for sufficiently challenging individual and group work?
- What does productive struggle look like in such an environment?
- How might all students be supported to share

their thinking using developmentally appropriate representations?

- What protocols might be developed to support a rich, inclusive, post-task mathematical discussion?

In this presentation, we consider these issues as we share what we have learnt from our efforts to teach mathematics in such a multi-age setting. We also explore the types of tasks and activities that appear to be most effective for engaging learners of all age groups in meaningful mathematics.

Beyond developing mathematical proficiency, multi-age settings are wonderful opportunities for developing the cross-curricula capabilities outlined in the Victorian and Australian curriculums. In this spirit, we conclude our presentation by reflecting on the affordances and constraints of teaching mathematics in such a context, including opportunities for peer-to-peer learning, critical and creative thinking, and supporting students' social and emotional development.

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GENERAL CAPABILITIES...STRATEGIES FOR INFUSING THEM INTO STUDENT LEARNING, YEAR 7-10

(Capability development in students, Workplace capabilities)

Matt Skoss, Mathematical Association of NSW
(Year 7 to Year 10)

To be a competitive society, and to build a community with empathy, we need young people entering the workforce to be flexible, nimble and adaptable in their work and home lives, underpinned by a strong sense of social justice. Victorian teachers have led the way, nationally, in responding to these challenges in their professional lives, in responding to the ever-changing COVID situation. Using mathematics as a vehicle, the General Capabilities can play a significant role in provoking students' thinking and developing their skill set for life beyond formal schooling.

How do we develop a flexible and adaptive student? Current students in school are expected to have around twelve jobs, and up to five careers during their working life. Employers, rather than asking for the more traditional basic skills, are calling for their employees to solve problems they've never encountered before, and to collaborate with others in

KEYNOTES: Friday, 9.15am-10.15am (cont.)

doing so. This is the environment in which our students are emerging. We need critical thinkers who are flexible and adaptable.

Our challenge as teachers, is how to offer students experiences that help to grow their awareness in this arena. 'Only awareness is educable' was a constant mantra of Caleb Gattegno, still highly relevant in guiding teachers' work in posing mathematical challenges requiring critical and creative thinking.

Brought to you by



MATHEMATICS BY DESIGN

(ICT capabilities)

Sarah Fenton, Square the Circle
Jennifer Palisse, Monash Tech School
Helen Silvester, Casey Tech School
(Year 7 to Year 10)

Meeting current education goals of developing learning opportunities for students that are not only highly collaborative, but also cross disciplinary can be challenging. In Victoria's Tech Schools, we use the Design Thinking framework as a way of developing collaborative STEM programs where students engage in new technologies to solve problems in a real-world context. Programs are typically centred around a 'How might we...?' question designed to deeply understand the needs of people. This raises an interesting question: how can teachers incorporate design thinking with mathematics, a discipline that is often considered problem-centred rather than human-centred?

In this session, we will begin with an overview of the Design Thinking framework. We will then discuss how it is currently used within the Tech Schools, as well as provide examples of Design Thinking projects suitable for the classroom. In particular, we will focus on how these large, and often messy, real-world projects can incorporate mathematics. We offer our own insights into where design thinking might best be used in the STEM curriculum, addressing both the pros and cons of adopting such a framework.

Brought to you by



PANEL: FIRST NATIONS STUDENTS AND MATHEMATICS EDUCATION, LESSONS FOR AUSTRALIA

(Valuing mathematics in society, Capability development in students, Numeracy in context)

Jodie Hunter, Massey University
Matthew Lillyst, Department of Education and Training
Cynthia Nicol, University of British Columbia
Daniel Steele, Aldercourt Primary School

All Levels

How do we better connect mathematics to Aboriginal and Torres Strait Islander histories and cultures, to ensure students benefit and are prepared with the intercultural capabilities required for their personal, civic and professional lives? In this panel discussion we will explore what works and emerging practices from the latest research. We will compare this to what has been implemented in other countries in relation to First Nations students. This panel will can improve our understanding of approaches to embedding first nations perspectives in the curriculum to enrich the learning experience for all students in our classrooms.

Brought to you by



SESSION 1: Friday, 10.25am-11.10am

WORK LIKE A MATHEMATICIAN WITH PROFESSOR MORRIS!

(Capability development in students, Numeracy in context, Valuing mathematics in society)

Jennifer Bowden, The Mathematical Association of Victoria
Douglas Williams, Black Douglas
(F to Year 6)

Enjoy an engaging workshop with Professor Morris and his intriguing sidekick as they explore a range of puzzles to inspire your students to 'work like mathematicians'. You will be challenged by the 50 puzzles presented, that cross all aspects of the maths curriculum and aim at developing skills and competencies utilised throughout a mathematician's journey. Whilst completing the puzzles you will discover the pedagogy behind the puzzle resource that promotes the context of working like a mathematician. Together we will explore a handful of puzzles in depth, looking at the capabilities, specifically critical and creative thinking, along with the teaching and learning students will need to develop a deep understanding of mathematics and be successful in the 21st century.

TEACHING AND ASSESSING THE CAPABILITIES THROUGH AUTHENTIC MATHEMATICAL TASKS AND PROJECTS

(Capability development in students, Numeracy in context)

Jess Szalek, Warragul North Primary School
(Year 3 to Year 8)

Did you know that you can harness the curriculum capabilities to foster student agency? By developing rich, authentic tasks with a low floor/high ceiling approach, students can access the learning at their point of need with a particular focus on critical and creative thinking. These open-ended maths projects, with multiple entry and exit points, allow every student the opportunity to be challenged and experience success, whilst also developing the skills and capabilities of numeracy in context of the real world. In this session, we will look at how to create these types of tasks, tapping into different facets of differentiation and delve into how to effectively assess through student self-assessment and continuum-based rubrics.

THE PLACE OF MANIPULATIVES IN THE SECONDARY CLASSROOM

(Capability development in students, Numeracy in context)

Vicky Kennard, Education Services Australia
(Year 7 to Year 12)

It is rare to see students in secondary school happily using manipulatives during a math lesson. Having had the opportunity to work and teach in the primary years I have become more aware of the value of the Concrete, Representational, Abstract model. This year I was able to complete a research project, at Monash University, on the attitudes, beliefs and knowledge that secondary maths teachers have of manipulatives. In this presentation, I will be delivering a review of the findings from this study and also demonstrating how we can bring manipulatives, concrete and virtual, into the classroom to improve engagement and deepen understanding.

VCAA FURTHER AND GENERAL MATHEMATICS - HELPFUL HINTS

(ICT capabilities)

Rebecca Hansen, Neale Woods, Virtual School Victoria
(Year 11 to Year 12)

This session will focus on using TI-Nspire CAS in the Victorian Curriculum Assessment Authority (VCAA) Further and General Mathematics study designs. The first part of the session will be on ways to assist students with creating widgets and documents that can be accessed during examinations. The second part of the session will involve techniques to assist teachers with creating curriculum material and files for student use in the classroom. Much of the material covered will be relevant for non-CAS curricula.



SESSION 1: Friday, 10.25am-11.10am (cont.)

INFUSING ABORIGINAL PERSPECTIVES IN YOUR MATHEMATICS LESSONS

(Capability development in students, Valuing mathematics in society)

Aylie Davidson and Matthew Lillyst, Department of Education and Training
(Year 3 to Year 10)

How can teachers include Aboriginal and Torres Strait Islander perspectives in their maths lessons? This presentation explores the concepts of 'perspectives' and 'culture' when designing meaningful learning experiences in mathematics that emphasise the Aboriginal and Torres Strait Islander Histories and Cultures cross-curriculum priority. Classroom activities and resources are offered to understand cultural knowledge systems better and highlight important mathematical ideas, such as exploring the sustainable practices of eel traps to understand measurement and geometry. Teachers will gain practical ideas for ways of embedding Aboriginal perspectives in their everyday maths lessons.

AN INSTRUCTIONAL MODEL THAT SUPPORTS STRUCTURED INQUIRY APPROACHES

(Capability development in students)

Peter Sullivan, Monash University
(F to Year 8)

To achieve the many benefits of student centred structured inquiry approaches to teaching mathematics, lessons need to be planned and taught in particular ways. Launch/Explore/Summarise is a good start but to this can be added particular approaches to differentiation and ways of consolidating learning. Using an illustrative lesson the elements of a particular instructional model will be outlined.

BRINGING COMPUTATIONAL THINKING AND DYNAMIC MODELS TO THE CLASSROOM

(Capability development in students, Valuing mathematics in society)

Kelly Lean, Wolfram Mathematica
Farid Pasha, Wolfram Research
(Year 7 to Year 12)

Millions of students worldwide use Wolfram Technologies daily. Stemming from the Wolfram knowledge-base that is Wolfram|Alpha to the central tool and Wolfram's flagship Mathematica system. Both tools have been incorporated for a higher level of education and thinking across a variety of STEM disciplines. From math and science to social studies and music, the Wolfram Technology System helps students grasp difficult-to-understand concepts better than a static textbook, offering interactive visualisations, homework solvers, and tools to learn how to program.

This demonstration aims to deliver a breakdown as to ways in which high school faculty can utilise Wolfram|Alpha technology to inject real-world data and explore relevant examples in their classes—helping to engage and excite their students. By demonstrating several real-world concepts through the means and curated data of Wolfram|Alpha, we will then look at how to access thousands of built-in mathematical functions and datasets, step-by-step exploration, through Mathematica to create interactive documents and presentations suitable to the Australian STEM classrooms. Some of the key insights to the presentation will include; how to access real-world data to explore real-world problems and how to deliver students valuable analytical skills during that problem solving stage through computational thinking. Furthermore, outlining ways in which teachers can quickly run computations in syntax or plain English to generate results.

WHAT ROLE DOES MATHEMATICS EDUCATION PLAY IN DEVELOPING STUDENTS' 21ST CENTURY SKILLS AND STEM CAPABILITIES?

(Capability development in students, ICT capabilities, Workplace capabilities)

Rachael Whitney-Smith, The University of Notre Dame
(Year 7 to Year 10)

As we move into the second decade of the 21st Century, often referred to as the information-age, we have seen global trends in curriculum reform emphasising the need for

students to develop 21st century skills deemed necessary for them to become active and engaged citizens and successful in their future career pathways. Rapid advancements in technology have impacted on industry and the majority of workplaces leading to an increased emphasis on STEM skills and a growing need for a STEM qualified workforce. This has led to educational initiatives and policy reform across Australia encouraging schools to provide learning opportunities to engage students in the STEM disciplines and enhance students' STEM capabilities. So what does this mean for mathematics education? What are STEM capabilities? What do learning opportunities that develop students' 21st Century skills in Mathematics look like? This presentation will address these and other questions concerning the role that mathematics education plays in developing students' 21st Century skills and STEM Capabilities.

DIFFERENT NUMERACIES FOR THE DIGITAL AGE: PUTTING APPLIED LEARNING UP FRONT IN VCE

(Capability development in students, Numeracy In Context, Valuing Mathematics In Society, Workplace Capabilities)

Justine Sakurai, Sandringham College and Educational Consultant
Dave Tout, Australian Council for Educational Research (ACER)
(Year 11 to Year 12)

With the exciting changes to the VCAL and VCE as a result of the Firth Review, a set of new numeracy and maths curriculum options are being developed to sit within the VCE structure. This session will share some of the insights, background and rationale behind these new and innovative curriculums and how they can be used to support a broad range of students gain improved capabilities in mathematics understanding and use. The new Applied Learning curriculum is framed around recent developments and knowledge about what maths and numeracy knowledge and skills young people need for their current and future lives as adults, within their personal, community and vocational/workplace lives. Contexts are the starting point and are framed in terms of personal, financial, civic, health, recreational and vocational classifications. Underpinning the teaching and learning is a problem-solving cycle with four explicit and separate components. Students are expected to develop a technical, mathematical toolkit to use as they undertake their numeracy activities and tasks, and students should be able to confidently use multiple mathematical tools—both analogue and digital/technological.

THE POWER OF PURPOSEFUL PUZZLES

(Capability development in students, Valuing mathematics in society)

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

A well-designed mathematical puzzle will encourage hours of skill practice while at the same time develop the capacity for critical and creative thinking. Puzzles can engage learners of any ability as evidenced by the countless number of students I've witnessed give up their own lunchtimes attempting to solve them.

This session will equip you to design your own puzzles and activities by drawing on the experience of someone who has made over 100. During this workshop we will discuss key principles for creating rich, engaging activities and participants will produce their very own mathematical puzzle.

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SESSION 2: Friday, 11.20am-12.05pm

USING REVERSE FRACTION TASKS TO PROMOTE REASONING.

(Capability development in students)

Kate Copping, Carmel Mesiti and Cath Pearn, The University of Melbourne (Year 5 to Year 8)

An understanding of rational number concepts and the ability to manipulate common fractions has been found to support the development of algebraic reasoning. For example, algebraic reasoning has been demonstrated when students solve reverse fraction tasks. Reverse fraction tasks require students to find the number of objects representing a whole collection when given the number of objects representing a fractional part of that collection.

This session will focus on the critical and creative thinking students need to solve reverse fraction tasks and develop a clear understanding of rational number concepts. Participants in this session will be introduced to two frameworks which classify the types of strategies students use to solve reverse fraction tasks.

MATHUP

(Capability development in students)

Hannah Marino, St John XXIII Primary School (Year 3 to Year 6)

In this presentation I will share how our school has utilised the Canadian based initiative 'MathUp', an online resource written by Marian Small to support teachers in delivering rich learning experiences that are designed to promote success for all students. This resource has been purposefully selected based on the three-part lesson design which promotes critical and creative thinking, and addresses the personal and social capability of the Victorian Curriculum. Additionally this resource has been designed to support teachers in their understanding of mathematical content knowledge through the use of questioning and professional videos which address the big ideas of mathematics. MathUp has been implemented in our school in Years 3-6 with the purpose of building on student learning centered pedagogy that we were introduced to as part of the Exploring Mathematical Sequences of connected, cumulative and challenging tasks (EMC3) project in 2019. The intent of this presentation is to demonstrate how this resource has been adapted to an Australian context and how it supports teachers and students to engage in learning tasks based on best pedagogical practice.

FREE FINANCIAL LITERACY EDUCATION RESOURCES TO DELIVER NUMERACY IN CONTEXT

(ICT capabilities, Numeracy in context, Workplace capabilities)

Damian Nicholson, Financial Basics Foundation (Year 7 to Year 12)

Financial Basics Foundation (FBF) provides free of charge to all Australian secondary teachers extensive resources and services designed to support students to develop their capacity to make responsible and informed financial choices and develop financial life skills.

The Victorian Mathematics Curriculum offers a significant opportunity to use financial literacy to teach Numeracy in context for a range of mathematical operations and applications within the Victorian AND Australian Curriculums and simultaneously use this context to build Workplace Skills and ICT capabilities.

This workshop will focus on exploring FBF's mathematics focussed financial literacy WebQuests, developed to help teachers dealing with COVID-19 disruption, as well as ESSI Money, an interactive online game delivered in an innovative app-based environment. Students practice a wide range of real-life earning, saving, spending and investing transactions and experience the financial consequences in a safe, fun and challenging way.

FURTHER MATHS EXAMS: USING THE CAS CALCULATOR EFFICIENTLY AND EFFECTIVELY

(Capability development in students, ICT capabilities, Numeracy in context)

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

This session will look at questions from this year's Further Maths papers and discuss how useful the CAS calculator was in determining their answers. 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 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.

SESSION 2: Friday, 11.20am-12.05pm (cont.)

LET'S OPEN WITH NUMBER TALKS

(Capability development in students, Valuing mathematics in society)

Alex Box, The Maths Collective
(F to Year 10)

What are number talks? And why is this 5-15 minute routine considered such a powerful maths opener? This session is an introduction to number talks - what they are and how, with careful and sustained implementation, they can transform students' (and teachers'!) maths experience. Focuses include the structure of a number talk, key pedagogical strategies, and provide quick tips for getting started in the classroom.

PICTURE THIS...

(Capability development in students, Numeracy in context, Valuing maths in society)

Amanda Cassidy, St Patrick's Primary School
(F to Year 4)

Maths is a language that we are asking our students to learn and understand. Picture books contain both imagery and dialogue that can ignite curiosity and assist students to develop mathematical skills and understandings. In this workshop, we will investigate how good quality picture books can develop deep mathematical understandings for our students. In addition, we will look at a range of tasks that utilise the mathematical proficiencies, focusing on enabling and extending prompts and how to differentiate learning for each and every one of our students.

IT'S A MATTER OF TIME

(Numeracy in context)

Judy Gregg and Carmel Delahunty, Independent Primary Maths Consultants
(F to Year 6)

Tick tock goes the clock! Learning about time is much more than just being able to read a clock. It is a difficult concept for students to grasp because it cannot be seen or felt. In addition to learning how to tell time, students need to have an awareness of time, an understanding of succession of time, and how to estimate and calculate elapsed time. This pursuit also covers aspects of the Victorian Science curriculum; exploring Earth's rotation, revolution and phases of the moon enhances students' understanding of time measurement units.

This workshop will equip participants with a multitude of practical activities, that go beyond teaching students to

read clocks. These experiences will be centred around four important areas: awareness of time, succession of time, elapsed time, measurement of time, and caters for students in Years F-6.

GEOMETRY EXPRESSIONS AND GX WEB - PUTTING THE UMPH INTO GEOMETRY

(Capability development in students, ICT capabilities)

Neale Woods,
(Year 9 to Year 12)

This session will cover Geometry Expressions and the free online GX Web, which are both constraint-based geometry programs. This means that after creating a geometric construction, the mathematical expressions and equations generated can be exported into CAS software such as TI-Nspire CAS, Casio ClassPad, and Mathematica, etc. Both are exciting, powerful geometry programs that are definitely worth further exploration. The session will cover the basic tools of the programs and include ways to incorporate them into the mathematics curriculum.

MYLNS - SNAPSHOTS OF SUCCESSFUL PRACTICE

(Capability development in students, Numeracy in context)

Naomi Coleman, Korumburra Secondary College
Helen Haralambous, The Mathematical Association of Victoria
Lachlan Hillier, St Helena Secondary College
Carly Joyce, Yarra Hills
Kylie O'Sullivan, Altona College
(Year 7 to 10)

The DET MYLNS (Middle Years Literacy and Numeracy Support) program identified students, at Years 7 and 9, who were identified with results significantly below standard. Schools were supported by appointing MYLNS Numeracy Improvement teachers (to work with staff) and MYLNS Student Support Numeracy teachers (to work with students). MAV has worked with Valad Solutions and DET in supporting these leaders. In this workshop, Helen will introduce school leaders, representing the different regions who will share a Snapshot of Practice regarding their current work. Carly Joyce (NE), Lachlan Hillier (NW), Naomi Coleman (SE) and Kylie O'Sullivan (Altona SC) will each present a MYLNS case study outlining a successful practice in numeracy on the theme: Holistic approaches to student learning growth. Participants will reflect on and develop their own practice

through hearing how other colleagues are successfully implementing MYLNS in their schools to make a difference in student Numeracy improvement.

USING ISLAMIC AND TRADITIONAL GEOMETRY TO LEARN PATTERN, SHAPE AND NUMBER

(Capability development in students, Numeracy in context)

Nabeel Khan, Nabeel Khan Art
(F to Year 12)

Geometry - the basis of many disciplines; Physics, Chemistry, Biology, Astronomy, Architecture, Art, Music... Geometric forms are also the building blocks of the Periodic table.

I teach children how to use a ruler and compass, to create the basic shapes of our universe. I teach not only the basic shapes, but with the older children, we make tessellating patterns inspired by Islamic art and architecture. There is great value to drawing by hand rather than a computer.

Alongside the drawing we talk about where these shapes appear in nature and how they can go discover them in a garden/park, skills for the rest of their school and personal lives.

I have recently released a teaching resource, a poster which is soon to be published as a children's book - teaching the fundamentals of visual number & geometry...

<https://nabeelkhanart.com/collections/counting-poster/products/your-magic-counting-poster-geometry-childrens-school-number-learning-steiner>

"The grand book of the universe... was written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is impossible to understand a single word of it" - Galileo 1623

SESSION 3: Friday, 12.15pm-1pm

REKENREK 101: HOW TO TEACH NUMEROUS MATHS FACTS/ CONCEPTS WITH THIS VERSATILE MATH MANIPULATIVE.

(Capability development in students, Numeracy in context)

Amy How, Amy How Ltd
(F to Year 4)

This virtual workshop is a must-see. You will be introduced to the most versatile, visual, concrete manipulative that will change the way you feel about using the CPA (Concrete-Pictorial-Abstract) approach in primary education. This introductory session will transform the way you teach the basic number sense. You will be shocked and amazed at how this one tool can be the mess-free answer to children developing a deeper understanding of so many concepts. Join me for this rekenrek workshop and you too will be singing the praises of this simple tool.

DISPOSITION: THE 5TH PROFICIENCY STRAND.

(Capability development in students)

Paul Staniscia, Oscar Romero Catholic Primary School
(F to Year 6)

There is a lot of research available to teachers today on what works best in mathematics education, including questioning techniques, lesson structures, student engagement and classroom environment. However, what works best for one learner may not be the same for another at that particular point in time. This is one of the many challenges teachers face when creating a successful mathematics classroom.

What much of the current research does suggest is that students should be the drivers of their learning and to develop this, we should not have classroom environments where students are 'unsure of what expectation teachers will have for them' (Boaler, 2016). Therefore, what students are learning, why they are learning it and how they know they have learned it should not be a secret shared only among teachers. Nor should the assessment teachers use to identify the progress students make. So how do we let students in on the secret in mathematics education?

Through this workshop participants will engage with the personal and social capability, by exploring ways productive disposition can be developed through teacher clarity, differentiated learning and goal setting.

KANT AND MATHEMATICS

(Valuing mathematics in society)

Terence Mills, Crusoe 7-10 Secondary College
(Year 7 to Year 12)

The acclaimed philosopher Immanuel Kant (1724-1804) is best known for his Critique of Pure Reason. Mathematics plays an important role in this seminal work on metaphysics. Kant posed the provocative question, "How is pure mathematics possible?" What does this mean? Why does Kant even ask this question? What is his answer? What is its relevance to how we view mathematics today, and present it to our students and the broader community? The aim of this presentation is to answer these questions because they shed some light on how society should value mathematics. In the course of the presentation, I will give an overview of Kant's life and Critique of Pure Reason.

USING AI AND MACHINE LEARNING TO DRAMATICALLY IMPROVE MARKING IN MATHEMATICS

(ICT capabilities, Workplace capabilities)

Brenton Wyatt, Turnitin
(Year 7 to 12)

Artificial Intelligence (AI) is proposed to make our teaching role easier, using big data to provide deeper insights into learning. But how does this work? Marking should provide actionable feedback to both students and teachers to help students learn and help teachers pace and direct instruction. However, marking is painful, consistency is hard, providing good feedback takes time, and there are the logistics, compounded especially in a remote learning environment.

This session will explore an example of how AI and digitisation can improve marking and assessment in mathematics. We will explore how to achieve a time-saving, consistent approach to feedback in the grading process using Turnitin's Gradescope.

THE SKILL, WILL AND THRILL

(Capability development in students)

Shane Crawford, Corwin Australia
(F to Year 12)

How would your learners describe themselves as mathematicians? Do the descriptions 'seekers of challenge', 'confident perseverers', and 'leveragers of prior knowledge' spring to mind?

How are you developing your learners' skill, will and thrill?

This session will provide strategies for increasing student capability in, and ownership of, their mathematics learning based on the Model of Learning by John Hattie and Gregory Donoghue (2016). It will provide practical examples of ways to design prior knowledge experiences (skills), enhance dispositions (will) and ensure challenge for all learners (thrill). These ideas will ultimately support your learners to answer the questions 'Where am I going, how am I doing and where to next?'

TEACHING IN REASONING IN STATISTICS AND PROBABILITY

(Capability development in students)

Michelle Fyfe, Dilys Potter, Hannah Young, Collingwood College
(Year 7 to Year 8)

During this session we will share our learnings from a focused investigation of our understanding of teaching, learning, and assessing statistical reasoning. In line with PISA finding that there is an overall decline in Australian's mathematical literacy, as well as our own data showing the smallest growth within the domain of Statistics and Probability, this became our focus for improvement. We will share how we analysed our current curriculum and improved our units based on formative assessments including the DAL, OnDemand, and a statistical reasoning assessment. We will share a unit of work and our learning from this process.

CHANGE THE ATTITUDE TOWARDS MATHS

(Valuing mathematics in society)

Kylie Love, Sydenham-Hillside Primary School
(F to Year 6)

Many students begin school with a toolkit in literacy skills, whereas fewer have numeracy skills under their belt. Attitudes towards mathematics in schools can be linked back to parents, guardians and other family members who may have had a negative experience with mathematics in their schooling. The phrases 'I'm not a maths person' or 'I wasn't good at maths either' can influence the way in which students, and the wider community view mathematics. As teachers of mathematics, primary school teachers and leaders are well positioned to shift the cultural view of mathematics. Through parent information sessions, rich and engaging curriculum and a relationship between school and home that openly promotes the value of mathematics, we can create a shift in the views of both the community and our learners that will enable us to

have the greatest impact on building mathematically minded students, with skills in problem solving, reasoning and creative and critical thinking.

KICKING GOALS AND FALLING LADDERS

(ICT capabilities)

Peter Fox, Texas Instruments
(Year 9 to 12)

If calculus is studying continuous change, how come most diagrams provided to students are static? In this session participants will use the Graphs, Geometry and Notes Applications on TI-Nspire to build dynamic representations for students to explore a range of familiar calculus problems. The dynamic representations allow students to see what is changing and what is constant, collect data and validate algebraic expressions and results. In a traditional face to face conference setting, this session would be quite challenging. In this online platform, you can pause and rewind the recording as often as you like and ultimately reach the goal: to build your own dynamic environments for your students to explore.

THE NET WORTH OF NETWORKS: GETTING READY FOR THE NEW AC

(Capability development in students, Numeracy in context)

Anna McGann and Bex Thompson, Maths Pathway
(Year 9 to Year 10)

Do you teach Year 9 or 10? The new Australian Curriculum has new content descriptors about 'networks'. We'll be talking networks in this session! Come and gain insights from teachers who have taught this content in the senior curriculum. We will discuss how networks are connected to the current curriculum, how to introduce the key ideas and language, and how to bring real life contexts into the classroom. You will come away with greater confidence to teach in a new curriculum area, worksheets with complete solutions and ideas for interactive classroom activities and discussions, and ways to help students overcome common misconceptions in this area.

SESSION 3: Friday, 12.15pm-1pm (cont.)

EQUITY AND AGENCY WITHIN MATHEMATICS EDUCATION

(Valuing mathematics in society)

Andie Hoyt, Daniel O’Kane, Mathspace
(Year 3 to Year 12)

The history of mathematics education in this country and in the United States has not always been one of inclusivity and accessibility. In the 20th century, many considered the study of mathematics to be ‘better suited for boys and not for girls’. In the USA, recent studies have demonstrated how black, Latinx and indigenous students continue to be mathematically disenfranchised.

Join us in an honest conversation with American ‘math’ educators, as we discuss the current social and political landscape in America. How teachers in the USA are attempting to make learning maths relevant and accessible to all students of all background. And also reflect on what we can do in Australia, in our own backyard, with our own disenfranchised students.

SESSION 4: Friday, 1.45pm-2.30pm

UNLOCK STUDENT ENGAGEMENT THROUGH SCAFFOLDED MATHEMATICAL REASONING

(Capability development in students, Numeracy in context)

Joel Townsend, Firefly Education
(Year 7 to 8)

Discover a logical and engaging method for teaching students how to approach mathematical reasoning with Bit Maths – a new resource for junior secondary. Too often, students transition from primary to secondary school without having been taught how to reason mathematically – leaving them under confident and disengaged as they encounter more complex problems. When asked to complete problems or inquiries that require them to apply reasoning skills, such as ‘proving’, ‘explaining’, ‘generalising’, or ‘justifying’, they don’t know what to do. In this presentation, you will learn how to scaffold a meta-cognitive approach to reasoning, that will not only help students solve complex reasoning questions and communicate their answers appropriately – but also ignite their passion for mathematics in and out of the classroom.

INTRODUCING STUDENTS TO COMPUTATIONAL/ALGORITHMIC THINKING -HOW COMPUTERS THINK DIFFERENTLY FROM HUMANS - THROUGH FIVE NUMBER SORTING ACTIVITIES

(Capability development in students, ICT Capabilities)

Max Stephens, The University of Melbourne
Sebastian Sardina, RMIT University
(Year 3 to Year 8)

This activity can start in the middle primary school and is intended to introduce teachers and students to a familiar problem of how to sort a group of numbers (less than 20 different numbers – all less than 100) in ascending order. The teacher presents a challenge to students and then asks them how they would solve the problem, and to explain how they did it in ways that others could follow. (A similar challenge can be presented to younger primary and pre-school children using smaller numbers.)

These initial activities are intended first to offer students opportunities to clearly express their own sorting procedures, thus introducing them to the idea of an algorithm. Expressing one’s ideas clearly for others to follow is very important for students to appreciate, as is an awareness that procedures can be made more efficient. Of course, some limitations of students’ intuitive algorithms will be considered before leading them on to two subsequent sorting activities

where more precise and unambiguous algorithms can be formulated.

PROBLEM SOLVING THROUGH CREATIVE EXPLORATIONS AND INVESTIGATIONS

(Capability development in students)

Bozena Graham, Wesley College
(Year 11 to Year 12)

The presenter will share ideas of creative explorations and investigations used in Year 11 Specialist Mathematics classroom to prepare students for independent thinking and problem solving.

EXPLORING INFECTIOUS DISEASE MODELS WITH HANDSHAKES

(ICT capabilities , Valuing mathematics in society)

Anthony Morphet, The University of Melbourne
(Year 7 to Year 12)

Mathematical modelling is an essential tool for understanding and managing infectious disease outbreaks, as COVID-19 has made clear. This presentation will describe one of the basic mathematical models of an infectious disease, the SIR model. We’ll cover both the discrete time version (which uses difference equations) and continuous time version (which uses differential equations and calculus). We’ll describe a classroom activity - the ‘Handshake Game’ - which simulates the spread of an infectious disease. We’ll examine how well the standard SIR model fits the Handshake Game, and describe some possible modelling activities that could spring from the activity.

THE IB APPROACH TO MATHEMATICS THAT EVERY EDUCATOR CAN USE.

(Numeracy In Context)

Katrina Mooney, Freelance Math Consultant
(Year 5 to Year 10)

A brief introduction to the IB MYP maths criterion and how it is explicitly taught and assessed. Understanding the IB approach to mathematics can help all teachers in all curriculums to look more closely at how they are teaching math content and the lenses that help students to become true mathematicians. A fun and engaging presentation with real-life examples and ideas you can take back to your own classroom. After teaching through the IB framework, I became a better maths teacher, why not see what it’s all about?!

SESSION 4: Friday, 1.45pm-2.30pm (cont.)

MATHS IN SCHOOLS SHOULD BE LIKE A GOOD SPAG BOL!

(Numeracy In Context)

**Lauren Lamont, Mitcham Primary School
(F to Year 6)**

Numeracy is a key ingredient for creating curious and competent mathematicians inside and outside of our classrooms. Utilising contexts that are relevant to our learners, are deliberately chosen to enrich mathematical concepts and highlight relationships is vital. Creating numerate learners is everybody's business - what ingredients will you add?

This session is suited for Foundation to Year 6 (Primary).

PRACTISING YOUR WAY TO MASTERY.

(Capability development in students)

**Anthony Harradine, Potts Baker Institute, Prince Alfred College
(Year 7 to Year 8)**

Assuming students should practice, what should they practice? Why should they practice? What should practice look like? Through Year 7/8 Geometry, we will discuss possible answers and discuss some examples.

SUCCESSFULLY DIFFERENTIATING MATHS LESSONS TO ADDRESS GAPS IN UNDERSTANDING USING LOW-FLOOR, HIGH-CEILING PROBLEMS

(Capability development in students)

**Alex Blanksby, Thomas Christiansen, Oxford University Press
(Year 7 to 10)**

Implementing differentiated learning in maths classrooms is spoken about, but seldom applied effectively. Teachers may find themselves under time constraints, without the resources they need, or may be unsure of how to apply remedial teaching methods. Adding critical thinking or open tasks can feel overwhelming and ask teachers to establish outcomes that seem hard to measure.

Remote learning during 2020 has impacted student engagement and progression in Junior Maths, making differentiation in the maths classroom more crucial than ever. Join education experts Thomas Christiansen and Alex Blanksby as they discuss strategies for addressing gaps in

understanding in Years 7-10, and share their ideas about differentiating using low-floor, high-ceiling problems.

WHY ARE THE FONTS ALL DIFFERENT? WRITING ASSESSMENTS THAT LOOK PROFESSIONAL.

(ICT capabilities, Workplace capabilities)

**Ewan Campbell, Bright P-12 College
Laura Gilbert, The Mac. Robertson Girls' High School
(Year 7 to Year 12)**

Compiling a test, assignment or examination and want it to look professional? This presentation shows you some tools and techniques in Microsoft Word so that you spend your time writing and marking, not formatting. We will provide participants with templates so they can explore as we present and ask questions.

In this presentation, we will be using the following software: Microsoft Word efofex products (link), Mathtype (link) and Snip & Sketch (Windows). You may like to download trial versions of these in before the presentation to follow along on your device. We predominately using Windows machines for these tasks and we are not experts about implementing these in other operating systems.

Time permitting, we will may also show you some useful features using Google Teamdrive, Google Forms and spreadsheets.

ENGAGE IN STEM LEARNING WITH PYTHON

(Capability development in students, ICT capabilities, Valuing mathematics in society)

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

The focus of this session will be using the Python coding feature on the TI Nspire handheld/ software to engage in STEM learning with Mathematics as a base of any STEM project. The TI Nspire is much more than a CAS / graphing calculator. The TI Python and TI Basic coding features empower the learner to develop metacognitive learning skills. This provides an ideal introduction and opportunity to step into the coding world.

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SESSION 5: Friday, 2.40pm-3.25pm

ABC OF ACTIVITIES TO INCLUDE IN JUNIOR SECONDARY CLASSROOMS

(Capability development in students, ICT capabilities, Numeracy in context)

Shelley Pendlebury, Nazareth College
(Year 7 to 8)

ABC of activities to include in junior secondary classrooms goes through the alphabet of engaging activities to include in lower secondary mathematics classrooms to improve the mathematics teaching and learning. The presentation will explain the activities and how the activities can be a benefit. Included are activities that improve a students mental maths, approximation strategies, that check for understanding and miss conceptions and improve mathematical numeracy. This presentation is designed for beginner teachers, and for teachers who wish to refamiliarise themselves with some well tried and tested, engaging style of tasks to incorporate into their classroom teaching. There are a variety of activities incorporating ICT, mental mathematics, vocabulary essential for mathematics progression and problem solving.

ADDRESSING THE CAPABILITIES THROUGH CONTEXTUAL PROBLEM POSING

(Numeracy in context , Valuing mathematics in society)

Kate Eastcott (F to Year 6)

Contextual problem-posing, or the generation of problems about a purposeful or relevant context, allows teachers and students to practice mathematics in a more meaningful way.

In this workshop teachers and leaders are invited to consider how engaging students in contextual problem-posing can provide opportunities to develop the capabilities, while deepening their mathematical understanding, increasing their enjoyment of mathematics, and building confidence in their mathematical abilities. We will explore how contextual problem-posing can address the key ideas of the capabilities, as well as how it can influence students to become mathematically minded individuals.

USING EFFECTIVE STARTERS, CLOSERS AND REFLECTIONS TO ENHANCE CRITICAL AND CREATIVE THINKING AND STUDENT VOICE

(Capability development in students)

Mark Collins and Samantha Horrocks, Northern Bay College
(Year 7 to Year 12)

This session looks at how to use lesson structure to pose effective starters, closers and reflections that get students thinking, exploring alternatives and considering constraints. This open ended exploration encourages creativity and student voice. It also looks at the effective use of the 'What if...' question to challenge students to consider new constraints, conditions and limits.

ENHANCING STUDENT ENGAGEMENT THROUGH INQUIRY-BASED LEARNING AND VALUING MATHEMATICS IN SOCIETY.

(Capability development in students, Numeracy in context, Valuing mathematics in society)

Penelope Kalogeropoulos, Monash University
Angela Liyanage, Salesian College
(Year 7 to Year 10)

In Mathematics, Inquiry Based Learning (IBL) (Fielding-Wells & Makar, 2008) allows for students to engage in the general capabilities of the Victorian Curriculum whilst also understanding how mathematical concepts exist in the 'real world'. It also allows for students to develop their ethical reasoning skills, foster teamwork and collegiality whilst also providing students the ability to continue developing their interpersonal skills.

Driven by values such as openness, rationalism and progress (Bishop, 1988), in 2020 – 2021 I set out to explore how I could teach exponentials through various thought provoking questions such as 'Should the Measles vaccination program be reinstated?' My aim was to inspire students to creatively and mathematically make ethical decisions that were driven by the benefit it would provide society, even if the ultimate decision was not the 'popular one'. Students were given agency in selecting the problem (seven options were provided) and were afforded the opportunity to engage in subjects such as science, geography and economics to support their decision and explore numeracy across the curriculum.

This presentation will include a mix of theory, strategies and reflections of my own experiences in IBL (with a focus on the IBL project on exponentials) that can be implemented into the classroom to drive student engagement in mathematics while also enabling students to understand how mathematics is valued in society.

THE 3 E'S - AN ELEGANT THINKING ROUTINE?

(Capability development in students, Numeracy In Context, Valuing Mathematics In Society)

Kathy Harrison, Virtual School Victoria
(Year 5 to Year 10)

Thinking routines are a useful way to help students become autonomous in their learning. The VHAP Mathematics course employs the 3E's as a way to help students evaluate different thinking strategies and methods for solving problems with a view to enhancing their repertoire of problem-solving skills. Critical thinking and a conscious development towards expertise is encouraged. A side benefit is that students also engage in self advocacy.

The 3 E's encourage students to identify which method is most:

- Effective – It works for me and the way I like to think.
- Efficient – This allows me to organize my thinking in such a way as to solve a problem quicker than otherwise.
- Elegant – This solution is simple and/ or original.

It is simple in that it can be understood effortlessly with no ambiguity. It simplifies complex ideas in a beautiful way. It is original or creative in that it presents a conclusion in an uncommon manner.

This session will explore the use of the 3E's using examples, along with the research and ideas underpinning it. Examples will be based on experience in high ability classrooms, regular classrooms and the online learning environment. While the 3E's were developed with a focus on high ability middle school students, it is useful for all students. This session is suitable for teachers and leaders, especially those interested in collaborative problem solving.

CRITICAL THINKING IN PRIMARY MATHEMATICS CLASSROOMS

(Numeracy in context)

Peter Stowasser, Queensland University of Technology
(Year 5 to Year 6)

Critical thinking is linked with 21st-century skills. It is something our curriculum and educational leaders value and hope to see in our classrooms. The problem, for many, is that knowledge in mathematics is viewed as certain known only by authority. For many, facts in mathematics are accepted quickly, without question or scrutiny. Beliefs clearly at odds with ideals of critical and creative thinking. This session shares the findings of a Ph.D. case study that examined climates related to critical thinking in primary mathematics classrooms. Barriers and enablers for fostering critical thinking in the classroom are shared.

EDROLO FOR YEAR 7 MATHEMATICS: DEEP ENGAGEMENT & MEANINGFUL LEARNING

(Capability development in students, ICT capabilities)

Laura Dortmans, Edrolo
(Year 7 to Year 8)

In 2022, Edrolo is launching brand new Year 7 Maths textbooks.

Our Year 7 resources are designed for deep engagement in Mathematics, with a focus on conceptual understanding, mathematical literacy and real-world application.

In this session we will be sharing what we've created, including: visual models; high-quality questions for scaffolded learning, from core maths skills through to higher-order thinking; and video solutions to support all learning levels. We'll also show you how our detailed teacher data is used to monitor student progress every step of the way.

SESSION 5: Friday, 2.40pm-3.25pm (cont.)

SO - YOU NOW TEACH MATHS - WHAT NOW?

(Capability development in students, Workplace capabilities)

Peter Collins, Dandenong High School
(Year 7 to Year 12)

Effective classroom teaching of secondary school mathematics. You have just got a job teaching maths – what do you do now? Things I know and use now, that I wish I knew 32 years ago.

I have run this session at the MAV conference for a number of years, live and online. Feedback has been overwhelmingly positive, it's why I bother to keep doing it. In keeping with one of my philosophies, the presentation itself has changed during this time, as a result of new information and attendee feedback.

In this session, the presenter will outline a number of strategies and philosophies, that he has found since finishing university, that he uses while planning and teaching class. He uses them because they work. They are from a wide variety of sources, and have all been effectively trialled. They are not just based on avoiding pitfalls, they are based on maximising learning success and creating the environment in which this can happen.

Examples will be given of how these techniques are utilised.

The format will be a lecture, but with an emphasis on being interactive (as much as possible)

This session is aimed at beginning maths teachers – both inexperienced teachers and teachers who are teaching outside their area of training. It is delivered by a very experienced teacher and presenter.

REAL TRIGONOMETRY USING REAL TIME REAL WORLD DATA

(ICT capabilities, Valuing mathematics in society)

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 as it has no restrictions on direction of travel or position.

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

(Capability development in students, ICT capabilities, Numeracy in context)

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

NEW EDITIONS IN 2022

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GENERAL INFORMATION

DATE AND TIME

MAV21 Virtual Conference will be held on Thursday 2 December and Friday 3 December from 8.45am to 3.30pm

REGISTRATION

Registrations are now open and will close on Friday 19 November 2021. Click link to register <https://mav.delegateconnect.co>

WHAT IS INCLUDED?

Your online conference pass will give you exclusive access to:

- All keynote speakers and sessions streamed live and on-demand
- 12 months unlimited post-Conference access to presentations, publications and resources
- Interactive Q&A sessions with speakers

For information regarding the conference including presenters, sponsorship and exhibition contact:

Jacqui Diamond
Conference Manager
jdiamond@mav.vic.edu.au

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We gather this information solely to manage your membership of the MAV and the services that we provide you. 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.

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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. For, program updates visit the 'program' page of the virtual platform.

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The Mathematical Association of Victoria would like to thank our sponsors and exhibitors for their continued support and for giving back to the mathematical industry.

Make sure you visit their profile pages on the MAV21 Conference Virtual Platform, <https://mav.delegateconnect.co/> and choose MAV21 conference, where sponsors and exhibitors are running promotions in addition to the passport competition. You can also watch promotional videos or chat or contact their team members.

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At anzuk, we understand and specialise in the service of education recruitment. We have dedicated teams delivering specific requirements across casual relief, contract placements and executive search engagements. In Melbourne, we have a team solely working with Mathematics teachers to secure contract and permanent opportunities at many of Melbourne's Independent and Catholic schools. We value our relationships with teachers and schools and the alignment of the right teacher with the right school is always our priority. We specialise in providing career guidance and pathways for teachers at every stage of their career journey. From graduates to principals, we assist in building your capacity through mentoring, CV building and interview coaching. We align your skills, experience and values with your next opportunity.



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Cambridge University Press Australia is committed to the future of education in Victoria and continues to lead the way in maths publishing for Australian schools.

We are pleased to announce the forthcoming publication of all new editions of our renowned Cambridge Senior Mathematics VCE titles, together with a new Foundation Maths Units 1-4 resource, for the new VCE Study Design for 2023.

With digital capabilities building on our widely used Year 7-10 Essential Mathematics series, the new Senior Mathematics resources will allow students to experience a continuum of learning, and provides teachers with access to quality testing, reporting and planning material across all year levels. These innovations combined with our trusted author team provide comprehensive curriculum coverage and a proven approach to teaching and learning to ensure the best outcomes for VCE students. [Connect with our Education Resource Team](#) today to help build a brighter future for your mathematics students.



www.casio.edu.shriro.com.au

Casio Education Australia - Supporting Math teachers in the Australian Curriculum.

Working with some of Australia's leading and most innovative teachers, Casio Education Australia strives to create content and resources that are relevant, engaging and easy to use in the classroom or online. With Videos for Learning, How to Videos and explained Exam Resources for past VCE's, browse our range of materials, and get the support you need at casioeducation.com.au.



TEXAS
INSTRUMENTS

<https://education.ti.com/en-au>

For more than 30 years, TI has been an active member of classrooms around the world, empowering teachers and inspiring students to succeed in mathematics and science. Through our calculators, coaching and classroom resources, TI Education Technology is transforming the way teachers teach and students learn STEM (science, technology, engineering and mathematics) subjects. With our award-winning products, engaging lessons, real-time assessment and top-notch professional development, TI is leading the way in mathematics and science education.

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KEYNOTE SPONSORS



AUSTRALIAN MATHS TRUST

www.amt.edu.au

The Australian Maths Trust (AMT) is a charity that helps teachers with resources and opportunities to enable their students to develop their problem-solving skills

AMT's newest teaching resource is Problemo, a free online platform that's packed with quality maths problems of varying difficulties, all aligned to the Australian Curriculum. Teachers can easily search and filter problems to work through in class, or set quizzes for students to do individually. Best of all, it's perfect for delivering lessons remotely.

AMT is best known for its extensive range of maths, STEM, computational and algorithmic competitions and programs – from one-day events, like the Australian Mathematics Competition through to teacher-led programs that run over a series of weeks or months.



www.education.vic.gov.au

The Department of Education and Training 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. DET leads the delivery of education and development services to children, young people and adults both through government schools and through the regulation and funding of early childhood services, non-government schools and training programs. Evidence-based approaches for effective numeracy and mathematics teaching from birth to Level 10, including lesson plans and videos of excellence in teaching and learning practice are collated in the Mathematics Teaching Toolkit.



Assessment and Curriculum made easy
Australian Curriculum • NSW Syllabus • Victorian Curriculum

www.essentialassessment.com.au

Essential Assessment is an easy and affordable tool for Victorian primary and secondary schools to deliver a consistent approach to Victorian Curriculum numeracy and literacy assessment and curriculum from F-10A. We are a whole-school approach to summative and formative assessment through an online differentiated assessment and curriculum aligned with the Victorian Curriculum. Our online assessment platform assesses and develops student knowledge within each content description and proficiency strand to create a personalised curriculum to progress each student's understanding within a strand, sub-strand and topic of the Victorian Curriculum. Essential Assessment complements good teaching practice while providing a consistent approach to assessment, curriculum and whole school data.



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Since 1908, Oxford University Press Australia and New Zealand (OUPANZ) has operated as a department of the University of Oxford. Today, we are the oldest continuous educational publisher in Australia and a microcosm of OUP's worldwide organisation. We're not for profit, all for education, and publish research-based teaching and learning materials for primary and secondary mathematics educators.

This year sees the launch of Oxford Maths 7-10, a suite of blended resources designed to guide Victorian students on a focused mathematics journey. Oxford Maths 7-10 features an innovative reporting system that makes it easy for educators to identify misconceptions and deliver differentiated, personalised mathematics learning experiences, build students' confidence, and save time lesson planning. To sample content from our ground-breaking new resources, visit oup.com.au/maths7-10. Oxford's market-leading range of primary mathematics resources help you to unlock your students' potential. From targeted teaching and extension programs to teacher support, we have the right primary maths resource for your classroom needs. Explore our range of primary maths resources at oup.com.au/primarymaths.



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We believe that practice can change lives. So we're on a mission to raise confidence and attainment in maths by teaching children the power of meaningful maths practice in and outside the classroom.

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Because we've found a way to make sure that students not only actually do their weekly practice but that it is of the highest quality.



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www.fireflyeducation.com.au/bitmaths

A new digital resource for junior secondary.

BitMaths is a new digital maths resource for Years 7 and 8. With comprehensive content, rigorous pedagogy and intuitive design, BitMaths provides teachers with everything they need to invigorate any maths classroom.

BitMaths lessons cover mathematical concepts, problem-solving and reasoning. Lesson resources include scaffolded teaching sequences, interactive slideshows, captivating videos, differentiated activities and more.

Find out more about BitMaths and [try it for free!](#)



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Edrolo

<http://edrolo.com.au>

More than 800 Australian secondary schools trust Edrolo as a core resource for everyday teaching and learning. We combine a systematic, innovative, and research-led approach to resource design with actionable analytics – giving school leaders, teachers, and students the tools they need to reach their goals.

Felstead Education

www.felstead.com.au

We offer something a little bit different in maths education – live performances and incursions that use the power of theatre and storytelling to entertain, engage and inspire students with the wonder of maths and numbers.

Since 1988 our fun filled shows have been delivered in over 1000 schools throughout Australia. We pride ourselves on helping students to see maths from a different angle – entertaining and inspiring them as a way to build engagement with maths.

Our current shows include The Maths Show, The Maths and Sport Show, The Maths Mindset Show and the soon to be released Maths and Climate Change Show.

We work with Primary and Junior Secondary students and are perfect for a maths week activity. We would love the opportunity to work with you to help your students see maths as full of fun, laughter and amazement. Chat with us at the conference or visit our website.

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We are passionate about Mathematics. In building our brand-new Jacaranda Maths Quest Victorian Curriculum series for Years 7-10, we have created a resource which supports teachers in ensuring that students of all abilities can achieve success – ensuring no student is left behind, and no student is held back. Our practical teaching advice in teachON, learning intentions and 3 levels of differentiated teaching programs further support and inspire teachers.

In Jacaranda's VCE Maths Quest series, we aim to help prevent misconceptions, making it accessible for every student and help prepare students for exam success. Our goal is to help teachers help students at the point of learning, so every student can experience success in VCE Mathematics – in the classroom, at home and thus ultimately in the exam.

Founded in 1954, Jacaranda is the Australian School Division of Wiley, a leading global learning company. We

develop and deliver inspirational digital learning solutions and education resources to secondary schools in Australia because we are deeply committed to the ideal that education brings lifechanging benefits to all students. Jacaranda digital resources are designed to be intuitive and accessible to all learners and increase student engagement through high quality, media-rich content. That is why more than half of the secondary schools in Australia rely on Jacaranda digital resources and solutions to help progress their digital learning journey.

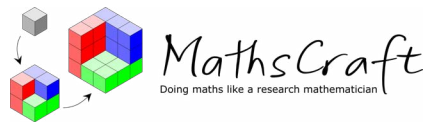


www.kilbaha.com.au

Kilbaha Education delivers mathematics digital resources to schools, teachers and students throughout Australia, New Zealand, the USA and the UK. All publications from Kilbaha Education are digital and are supplied to the purchasing school in both WORD and PDF with a school site licence to reproduce for students in both print and electronic formats. Kilbaha Education is currently preparing new and exciting mathematics content for the Victorian Mathematics Study Designs that begin in 2023. Our writers are highly qualified, experienced classroom teachers. Our mathematics resources cover the class levels from Year 3 through to Year 12. Our VCE Mathematics Trial Examinations for Further Mathematics, Mathematical Methods and Specialist Mathematics are well known and have been used by schools for decades. In 2021, Kilbaha Education has also provided Queensland mathematics teachers with Trial Examinations for the new external examinations run by the QCAA. Many of our mathematics resources are interactive with automatic checking of student input and automatic marking and scoring of assignments. Our assessment products for Mathematics can be used to keep track of student progress in numeracy. Our interactive digital resources can be implemented simply and effectively on any computer using the free downloadable Adobe Acrobat Reader.

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EXHIBITORS



www.mathscraft.org

MathsCraft: Doing Maths Like a Research Mathematician is a program that was developed in collaboration with maths teachers and working research mathematicians. The program is designed for all students in Years 5-10, offering the chance to engage in authentic, challenging adventures that provoke curiosity, inspire creativity, and promote logical and critical thinking... all using mathematical knowledge that they are already comfortable with.

We offer:

- Professional development and training providing a hands-on approach to MathsCraft ideas to solve various problems and learn how to give students an authentic experience of doing maths like a mathematician.
- The MathsCraft Curriculum is a companion to the Australian Curriculum and supports teachers to deliver the MathsCraft approach in their classrooms, including a collection of problems and resources, along with an assessment and certification.



<https://mathspathway.com>

At Maths Pathway we envision a world where every student experiences growth and success in maths. No matter their current level, or their socio-economic background. One in which all people, adult or child, are confident with numbers. This is exactly why our founders, teachers Richard and Justin, developed the Maths Pathway Learning and Teaching Model in collaboration with thousands of other teachers. The Maths Pathway model is a holistic approach that combines education best-practice with technology to entirely replace the textbooks, apps and tech systems used to teach maths in schools. The Maths Pathway model works for all students because it meets them where they happen to be in their learning journey with our students mastering twice as much of the curriculum in one year as they would in a traditional classroom.



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<https://education.ti.com/en-au>

For more than 30 years, TI has been an active member of classrooms around the world, empowering teachers and inspiring students to succeed in mathematics and science. Through our calculators, coaching and classroom resources, TI Education Technology is transforming the way teachers teach and students learn STEM (science, technology, engineering and mathematics) subjects. With our award-winning products, engaging lessons, real-time assessment and top-notch professional development, TI is leading the way in mathematics and science education.



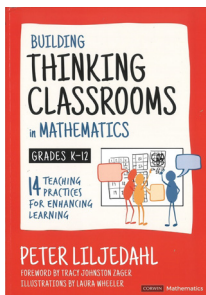
www.wolfram.com/knowledgebase/

This demonstration aims to deliver a breakdown as to ways in which high school faculty can utilise Wolfram|Alpha technology to inject real-world data and explore relevant examples in their classes – helping to engage and excite their students. By demonstrating several real-world concepts through the means and curated data of Wolfram|Alpha, we will then look at how to access thousands of built-in mathematical functions and datasets, step-by-step exploration, through Mathematica to create interactive documents and presentations suitable to the Australian STEM classrooms. Some of the key insights to the presentation will include; how to access real-world data to explore real-world problems and how to deliver students valuable analytical skills during that problem solving stage through computational thinking. Furthermore, outlining ways in which teachers can quickly run computations in syntax or plain English to generate results.

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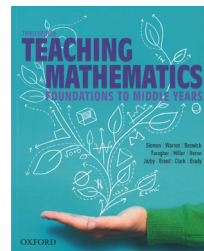


BUILDING THINKING CLASSROOMS IN MATHEMATICS

K-12

Teachers often find it difficult to implement lessons that help students go beyond rote memorisation and repetitive calculations. Sparked by observing teachers struggle to implement rich mathematics tasks to engage students in deep thinking, this book helps teachers implement optimal practices for thinking and deep mathematics learning to occur.

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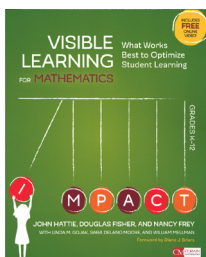


TEACHING MATHEMATICS: FOUNDATIONS TO MIDDLE YEARS, THIRD EDITION

F-9

Enable your students to become confident, proactive teachers of mathematics. Following an evidence-based approach focused on identifying and reflecting on student reasoning, pre-service teachers are encouraged to develop a deep understanding of the big ideas in mathematics and the connections between them. The text has been revised extensively, with a new structure that points more directly to the learning progressions involved in developing a deep understanding of mathematics. Interspersed throughout the text are activities and thought-provoking teaching scenarios for pre-service teachers to explore, whether individually, in groups or in the classroom.

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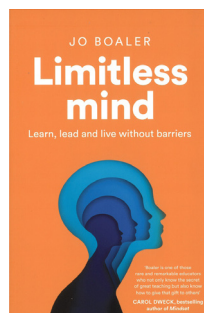


VISIBLE LEARNING FOR MATHEMATICS

EY-12

Rich tasks, collaborative work, number talks, problem-based learning, direct instruction...with so many possible approaches, how do we know which ones work the best? In *Visible Learning for Mathematics*, six acclaimed educators assert - it's not about which one, it's about when. This book will show you how to design high-impact instruction so all students demonstrate more than a year's worth of mathematics learning for a year spent in school.

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LIMITLESS MIND

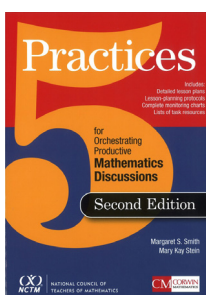
K-VCE

When we learn, we change what we believe and how we interact with the world. This changes who we are as people and what we can achieve.

Many people grow up being told they are 'not a maths person' or perhaps 'not smart'. They come to believe their potential is limited. Now the latest science has revealed that our identities are constantly in flux; when we learn new things, we can change our identities, increase our potential and broaden our capacity to receive new information.

Drawing from the latest research, Professor Boaler followed thousands of school students, studied their learning practices and examined the most effective ways to transform pupils from low to high achievers. In *Limitless Mind*, Boaler presents original groundbreaking research that proves that limiting beliefs really do hold us back from fulfilling our potential and that with a few careful life hacks we can transform our potential for good.

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FIVE PRACTICES FOR ORCHESTRATING PRODUCTIVE MATHEMATICAL DISCUSSIONS

F-VCE

The five practices teachers know and love for planning and managing powerful conversations in mathematics classrooms are unpacked with new insights on anticipating, lesson planning, and lessons learned from teachers. This framework for orchestrating mathematically productive discussions is rooted in student thinking to launch meaningful discussions so important mathematical ideas are brought to the surface, contradictions are exposed, and understandings are developed or consolidated.

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