

THE MATHEMATICAL ASSOCIATION OF VICTORIA



1 & 2 DECEMBER

VALUING MATHEMATICS IN A CHANGING WORLD CONFERENCE SYNOPSIS

59th Annual Conference - Virtual and In Person

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WELCOME TO MAV22



Welcome to MAV22 – Valuing Mathematics in a Changing World

On behalf of the MAV Board and the conference committee, I invite you to the 59th Annual Conference (MAV22) onThursday 1 to Friday 2 December 2022.

The theme for MAV22, Valuing Mathematics in a Changing World, is timely, particularly given the past two years we have experienced, and that mathematics plays a crucial role in our personal, professional and civic lives. More specifically, mathematics is the foundation for responding to and managing societal issues, such as pandemics, environmental and social problems. In the workplace, mathematics is used every day to communicate, plan, visualise, monitor, evaluate systems and processes, interrogate data and information, and predict outcomes in an increasingly information rich and technologically advanced society.

On a personal level, mathematics is used in a range of contexts and underpins our ability to make informed decisions about personal finance or health, and recreation where numeracy is required for daily life. Algorithmic thinking, often out of sight and out of mind from our day-to-day activities, underpins the new technology we see advancing around us. As educators we want our students, parents and carers, and community to value and connect with mathematics in our fast-paced and changing world. We need to actively engage students and equip them to be problem solvers, and critical and creative users of mathematics now and in the future. This requires educators who are adaptable, innovative and flexible in their pedagogical practices.

After two successful years of online conference, we are delighted MAV22 will be a mix of virtual and in-person sessions. We are anticipate over 800 mathematics educators including teachers, academics, policy makers, curriculum experts and resource developers will come together to share their expertise, experiences, and ideas.

Join us either online or in-person to share your ideas, stories, and enthusiasm for engaging in and exploring the different ways we experience and value mathematics across these two days.

- Ann Downton, Conference Convenor

www.mav.vic.edu.au

CONTENTS

KEYNOTES	Page 4
PROGRAM AT A GLANCE	Page 10
PROGRAM IN DETAIL	Page 26
PRESENTERS LIST	Page 80
GENERAL INFO	Page 82
SPONSOR AND EXHIBITORS	Page 83

SCHEDULE

Thursday 1 December 2022			
8am - 9.15am	Registration		
9.15am - 10.15am	Keynote presentations		
10.15am - 11am	Morning tea (for in-person delegates)		
	Bonus session for online delegates (10.25am-10.55am)		
11am - 11.50pm	Sessions		
12pm - 12.50pm	Sessions		
12.50pm - 1.30pm	Lunch		
1.30pm - 2.20pm	Sessions		
2.30pm - 3.20pm	Sessions		
3.20pm - 4.30pm	Networking drinks		
4.30pm	End of day 1		

Friday 2 December 2022

8am - 9.15am	Registration
9.15am - 10.15am	Keynote presentations
10.15am - 11am	Morning tea (for in-person delegates)
	Bonus session for online delegates (10.25am-10.55am)
11am - 11.50pm	Sessions
12pm - 12.50pm	Sessions
12.50pm - 1.30pm	Lunch
1.30pm - 2.20pm	Sessions
2.30pm - 3.20pm	Sessions
3.30pm	Conference close

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KEYNOTES

Keynotes are available to both in-person and online delegates..

PRESENTERS



GEORGE GADANIDIS

COMPUTER PROGRAMMING IN THE MATHEMATICS CLASSROOM, GRADES 1-9: THE ONTARIO, CANADA, EXPERIENCE

For several years George has been working and researching in grades 1-10 classrooms in Canada, and in Brazil, integrating computer programming within mathematics education. He has also worked with the Ministry of Education in Ontario, Canada, doing background research for reforming curricula and advising curriculum writing teams. They now have in Ontario explicit computer programming expectations within the algebra strand for all grades 1-9. This has affected what mathematics is taught, how it is learned, and who can learn it.

This keynote presentation is supported by

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CATHERINE ATTARD

MATHEMATICS EDUCATION: CHANGING TIMES, CHANGING PRACTICES

Catherine Attard is Professor in Primary Mathematics Education and Deputy

Director of the Centre for Educational Research at Western Sydney University. She is a multiple award-winning educator who has transformed teaching and learning in primary mathematics at Western Sydney University for over 15 years. Her philosophy, while straightforward, is transformative: Catherine combines great dedication for teaching engaging mathematics with her own experiences as a primary classroom teacher to motivate and inspire pre-service and qualified teachers. Catherine's research is focused on student engagement with mathematics and issues surrounding the pedagogical practices that influence students' engagement.

Catherine also researches contemporary teaching practices through the use of digital technologies, and the practices of middle leaders in Australian schools.

Catherine has won several teaching awards, including a 2016 Australian Awards for University Teaching (AAUT) Teaching Excellence Award, an Office of Learning and Teaching



citation for Outstanding Contributions to Student Learning and the Western Sydney University Vice-Chancellor's Excellence in Teaching Award. She regularly presents workshops and keynotes nationally and internationally and is the current President of the Mathematics Education Research Group of Australasia (MERGA), a past president and Life Member of the Mathematical Association of New South Wales (MANSW) (2014-2015), and past editor of the professional journal, *Australian Primary Mathematics Classroom*. Catherine is also the author of the leading mathematics education blog, engagingmaths.com, as well as the author of several popular mathematics teacher resource books.

This keynote presentation is supported by

EssentialAssessment

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PEDAGOGIES TO AMBITIOUSLY ENGAGE EARLY YEARS STUDENTS

JANETTE BOBIS

Janette Bobis is Professor of Mathematics Education in the Sydney

School of Education and Social Work at The University of Sydney. She was a primary school teacher for over eight years before transitioning to the tertiary sector where she now teaches mathematics education to primary pre-service and inservice teachers. Janette's research and teaching focus on student engagement in challenging mathematics tasks, early mental computational strategies and the enhancement of teacher mathematical knowledge and pedagogy for teaching.

This keynote presentation is supported by



Education and Training

JILL BROWN AND MELANIE O'REILLY

FROM PROBLEM SOLVING AND REASONING → UNDERSTANDING AND FLUENCY



Jill Brown is a senior lecturer in mathematics education at Deakin University. Following on from over two decades teaching secondary Mathematics, she has now been involved in primary and secondary Mathematics teacher education for

almost as long. She is interested in mathematical thinking including mathematical modelling and reasoning across all levels of schooling. She has a special interest in using multiple representations, digital technology, and classroom discourse to increase opportunities for deep understanding by all learners.



Melanie O'Reilly is a primary school teacher, passionate about students and learning, particularly Mathematics and English. She has been teaching in state primary schools since 2005 and i s currently at Findon PS. She has taught in all primary year levels, but has a love for the early years. She was the whole

school mathematics leader for several years, and is currently sharing a 3-4 class.

This keynote presentation is supported by



H H H te M T

HAYLEY DUREAU NIMBLE NETWORKS

Hayley Dureau is a Mathematics teacher and the 2022 Mathematics Master Teacher in the inaugural Teaching Excellence Program at

the Victorian Academy of Teaching and Leadership. She has spent this year working with outstanding Victorian Primary and Secondary Mathematics teachers across the Government, Independent, and Catholic sectors. Prior to this, she held the position of Leading Teacher: Head of Student Voice at Mount Waverley Secondary College. Passionate about enhancing teaching and learning by improving relationships between staff and students, Hayley's work in student voice involved creating systems and opportunities for students to provide professional learning for staff and design feedback tools which teachers use regularly, allowing students to provide feedback and discuss their learning with their teachers.

Hayley is a doctoral candidate (Doctorate of Education) at the Melbourne Graduate School of Education. Her research explores how teachers use feedback from students to inform their practice. She holds a Masters of Instructional Leadership and has undertaken professional learning at the Harvard Graduate School of Education, USA. Hayley has shared her work in Student Voice with educators in Australia, and worldwide.

Hayley has presented to mathematics educators across Australia and to pre-service Mathematics teachers at several universities. She is also a Texas Instruments Teacher Trainer.

Hayley received the 2021 Commonwealth Bank Teaching Award and was awarded the CHOOSEMATHS Outstanding Secondary Teacher Award in 2018 by the Australian Mathematical Sciences Institute. As a recipient of the 2017 George Alexander Foundation Fellowship, she undertook applied research in the area of Student Voice and STEM Education in Denmark.

In 2016 Hayley was named Victorian Department of Education and Training Outstanding Secondary Teacher of the Year. She was a 2016 ACEL New Voice in Educational Leadership Scholar, and in 2015 she was awarded the VicSRC Teacher Advisor Award.

This keynote presentation is supported by







MARILYN FLEER

MOTIVATING STUDENTS IN MATHEMATICS THROUGH CONCEPTUAL PLAYWORLDS AND REALWORLD SITUATIONS

Laureate Professor Marilyn Fleer is an Australian Research Council Laureate Fellow and Director of the Conceptual PlayLab at Monash University. She has been a curriculum writer, advisor and mentor to ACARA. From over 20 years of research, she has developed an evidence-based model that supports STEM concept formation in play-based settings and in primary schools. Recently she has been working with an amazing team of teachers on a maths curriculum project at Laburnum Primary School where Foundation to Year 6 students engaged in a Conceptual PlayWorld and RealWorld situations respectively.



SHELLEY HANNIGAN MATHEMATICS THROUGH AN ARTISTIC EYE

Shelley Hannigan is a Senior Lecturer focusing on pre-service teacher education at Deakin University. She

specialises in art education but also teaches units in education studies, art-well-being and creative pedagogies. She is also a practicing artist researching practice-based research and supervising PhD students. Her research also investigates creative practices that can contribute to enhanced learning and well-being, practice-based research and transdisciplinary practices such as arts-health and STEAM. Her recent publications discuss the use of art in teaching and learning science in secondary schools and the important role of aesthetics in this process as well as creativity.

This keynote presentation is supported by







PETER SULLIVAN

PROBLEM SOLVING AND REASONING CAN BUILD MATHEMATICAL UNDERSTANDING AND FLUENCY

Peter has had a career that combines research into task design with the development of teacher support resources and classroom trialling. He was author of the *Shape of the Australian Mathematics Curriculum*, a paper commissioned by the National Curriculum Board to lay the foundation of the Australian curriculum. Subsequently he was appointed the lead writer for the development phases of the curriculum and has supported ongoing development of the documents, including consulting on the review conducted in 2015. He was also the author of the Australian Education Review publication Teaching mathematics: Using research-informed strategies that has now been downloaded over 240,000 times from the ACER website.

Peter was editor for seven years, and for three years chief editor of the prestigious *Journal for Mathematics Teacher Education*, published by Springer. He was also editor of the *Mathematics Education Research Journal* published by Springer. He has an extensive list of publications for teachers and researchers including books, books chapters, journal articles and conference publications.

This keynote presentation is supported by





PAUL SWAN

THE VALUE OF WORTHWHILE TASKS AS AN EFFECTIVE PEDAGOGY IN MATHEMATICS: ONLINE AND OFFLINE

Paul Swan works with school leaders and teachers to improve the teaching of mathematics in primary schools. He has written many books and games – many of which are free on his website www.drpaulswan.com.au - to support the teaching and learning of mathematics. More recently he has been working on the development support materials for students requiring intervention in mathematics and help for teachers trying to teach students how to solve word questions in maths.

This keynote presentation is supported by



SECONDARY PANEL

PETER FOX, ALLASON MCNAMARA TOM MOORE, RACHAEL WHITNEY-SMITH

VALUING AND EXPLORING HOW TECHNOLOGY ENHANCES MATHEMATICAL INVESTIGATION AND DISCOVERY.



Peter Fox is passionate about mathematics, education and the way technology can be used to engage, excite and enhance student understanding. Peter taught high school mathematics for 25 years. In his first year of teaching (1990) he

wrote machine coded routines that connected a bicycle to a computer so his mathematics and physics students could interact with distance, speed and acceleration - time graphs. He has used data logging, video analysis and interactive media for many years to help motivate and inspire students. Peter has also worked as a project manager at the University of Melbourne, taught DipEd students at Monash University, worked on VCAA course review and examination panels, provided resources and professional development in various regions around the world as they move to incorporate a range of technologies in the mathematics classroom. Peter works with Texas Instruments providing professional development, website and product development. He was a part of the team that supported the development of TI-Nspire and TI-Innovator and continues to develop free resources for teachers and students.



Allason McNamara teaches senior mathematics at Trinity Grammar School Kew in Melbourne. Previously she has been Head of Mathematics at Mount Scopus Memorial College and a number of other independent schools. She has a Masters Degree

in Mathematical Modelling and Data Analysis, two Graduate Diplomas and a Degree in Agricultural Science from Melbourne University. She has been a co-author of several mathematics textbooks and VCE Specialist Mathematics examinations, and the Chief Assessor for VCE Mathematical Methods for the VCAA (Victorian Curriculum and Assessment Authority). She has been on a number of advisory committees for the VCAA and was part of the federal government's Expert Advisory Panel for the Year 1 Literacy and Numeracy testing. She is on the Board of the National Mathematics Summer School (NMSS) and the Australian Maths Trust (AMT) and is a Past President of the Australian Association of Maths Teachers (AAMT). Allason

6

is a Life Member and Past President and Treasurer of The Mathematical Association of Victoria and has done many presentations at the MAV conferences including keynote addresses. She is a actively involved with MAV, writing the MAV trial exams, lecturing to VCE students and teachers and running state-wide Mathematics Games Days.



Thomas Moore is a passionate educator whose work has spread across many sectors of the Mathematics education domain. He has been a Leading Teacher (Head of Mathematics), DET tutor, and CRT at many schools across Melbourne,

and has worked with various Maths education learning and technology companies over the past 10 years. Thomas is currently completing his PhD, exploring how effective teachers of Mathematics develop productive pedagogical relationships with their students, and he enjoys sharing his ideas and resources with teachers through his Maths education consultancy work. Thomas is a regular presenter at MAVcon, he was the 2022 runner-up at the Australian Toastmasters Public Speaking Championship (Vic, Tas & SA), and he has keynoted various conferences over the past few years. Thomas is excited by the opportunity to delve into, explore and unpack how technology can best be used to enhance mathematical investigation and discovery.



Rachael Whitney-Smith is the Mathematics curriculum specialist at ACARA, responsible for Mathematics Curriculum F-12 and led the recent Australian Curriculum: Mathematics review and writing of AC: M version 9.0. She is also undertaking her PhD at

Notre Dame University in Mathematics Education. Rachael is passionate about applied mathematics, STEM and teaching mathematics through rich tasks that engage student thinking and reasoning, problem solving, modelling and investigation processes. Rachael has worked on National and International projects focussed on improving the mathematical outcomes of Australian students and has actively participated in the OECD Education 2030 project. Rachael is an active member on a number of mathematics advisory groups, member of ATSIMA, MERGA and NCTM, and led the work in revising the National Numeracy Learning Progressions as part of the National Online Formative Assessment Initiative. Rachael has been the Executive Officer, a Professional Learning consultant and is currently a board member for the Mathematical Association of Western Australia and on the board for the Australian Association of Mathematics teachers.





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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.



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.



We develop educator skills in implementation of evidencebased 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.

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.

MATHS ACTIVE ACCREDITATION

SESSION SUMMARY: THURSDAY

THURSDAY 1 DECEMBER 2022

Achieving greater equity	Valuing evidence	Technology to enhance investigation
Exploring effective pedagogies	Improving individual and societal outcomes	Multiple sub-themes

	Deem	Keynote		Online session	Session A	Session B	
	Room	9.15am - 10.15am		10.25am - 10.55am	11am-11.50pm	12pm-12.50pm	
Jates	Room 1	Pedagogies to ambitiously engage early years students Janette Bobis Supported by		Using the place value assessment tool (PVAT) to guide your place value teaching in 2023 <i>Angela Rogers</i>	Developing a thinking classroom: teaching and learning insights Bernadette Long, Angela Rogers	Problem solving: more than just solving problems Paul Staniscia	
erson and online deleg	Room 2	The value of worthwhile tasks as an effective pedagogy in mathematics: online and offline Paul Swan Supported by	MORNING TEA 10.15am-11am	Engineering 'aha' moments in number Doug Williams	How is critical thinking valued in mathematics? <i>Stacey Lamb</i>	Developing a whole school approach and school vision about the teaching of Mathematics. Jessica Kurzman	LUNCH 12.50pm - 1.30pm
e available to in-pe broadcasted	Room 3	Mathematics through an artistic eye Shelley Hannigan Supported by OXFORD UNIVERSITY PRESS	10.15am-11am (online delegates have the opportunity to attend a bonus online session that runs from	Concrete, representational and abstract pedagogy Jonathan Carter	Further maths exams: using the CAS calculator efficiently and effectively <i>Kevin McMenamin</i>	Do you wonder what explicit teaching is in the middle years? Helen Chick, Allan Dougan, Sharyn Livy	
ns in rooms 1 - 10 ar vill be recorded and l	Room 4	Secondary Nimble networks Hayley Dureau Supported by TEXAS INSTRUMENTS	10.25am ⁻ 10.55am)	Integrating 'MathTask' in mid-senior level mathematics classroom: a powerful pedagogical tool to promote students' conceptual understanding and connection <i>Jiqing Sun</i>	Detailed Analysis of CAS Calculator usages in 2022 VCE Specialist Maths Exam 2 <i>Peideng (Martin) Nie</i>	Proof: a new topic in Specialist Maths Katherine Seaton	
Session They w	Room 5	Computer programming in the mathematics classroom, Grades 1-9: The Ontario, Canada, experience George Gadanidis Supported by jacaranda A Wiley Brand		Problem solving: getting them all aboard Andrew Greville, Mark Ljubic	Alleviating anxiety Dietmar Schaffner, Matthew Schaffner	Using NAPLAN questions to help inform your teaching Nadia Abdelal	



Session C	Session D
1.30pm-2.20pm	2.30pm-3.20pm
Do you wonder what explicit teaching is in a primary mathematics classroom? Helen Chick, Allan Dougan, Sharyn Livy	Evidence-based multiplication in the classroom <i>Michael Nelson</i>
Using maths talks to build number sense and transform the maths learning experience <i>Alex Box</i>	Unpacking the mathematical processes in the new Australian Curriculum: Mathematics (Primary) Rachael Whitney-Smith
Foundation Mathematics Units 3 and 4 - interesting data graphs David Leigh-Lancaster	Infinite thingies Anthony Harradine
Problems worth coding - pseudo code and algorithmic thinking Peter Fox	Free innovative financial literacy resources from FBF Damian Nicholson
How we taught Year 7 Maths at Sandringham College in 2022 Wendy Taylor	How do you prepare learners for real-world problem solving in a computational age? Kelly Lean, Alec Titterton



SESSION SUMMARY: THURSDAY (cont.)

THURSDAY 1 DECEMBER 2022

Achieving greater equity	Valuing evidence	Technology to enhance investigation
Exploring effective pedagogies	Improving individual and societal outcomes	Multiple sub-themes

	Deem	Online session	Session A	Session B		Session C	Session D	
	Room	10.25am - 10.55am	11am-11.50am	12pm-12.50pm		1.30pm-2.20pm	2.30pm-3.20pm	
delegates	Room 6	Footy Feud!: Developing numeracy through sport Andrew Williams	Using cards and counters to link the proficiencies David Dunstan, Paul Swan	Enhancing student engagement through creative problem solving, a community of practice Jennifer Bowden, Megan Teefey	LUNCH 12.50pm - 1.30pm		Launch, Explore and Summarise- Tips for implementing a new instructional model <i>Michael Minas</i>	A few of our favourites: mathematical tasks and tips! Jennifer Bowden, Ellen Corovic
son and online	Room 7	What is 'best practice' in 2022? What is great teaching? What are outstanding pedagogies? <i>Jennifer Bowden, Peter Saffin</i>	Assessing students: one size does not fit all! Kate Copping, Carmel Mesiti, Catherine Pearn	First 10 days of maths: establishing a consistent learning culture across your school Steve Lester, Chris Terlich		Learning sequences to support and inspire teachers F to Y4 <i>Dianne Liddell</i>	Mathematics for social justice Jenna Dore	
able to in-per asted	Room 8	Worthwhile CAS calculator use in this year's mathematical methods exam 2 Kevin McMenamin	Maths games to engage students Helen Haralambous	Mathematical Methods Exam 2-2022 solutions on CAS (TI Nspire) Sanjeev Meston		Meta-cognition skills: Supporting senior mathematics students Rohani Mohamad	Equivalent fractions: from Cuisenaire rods to calculus Stephen Paatsch	
s 1 - 10 are avails rded and broadc	Room 9	Maths through the matrix of poetry Tom Petsinis	Planning for meaningful formative assessment strategies - informing teaching and learning whilst prioritising well-being <i>Emma Moore</i>	New teacher series, Part 1: Effective and powerful pedagogical approaches. Thrive in your first 5 years of teaching! <i>Danijela Draskovic</i>		New teacher series, Part 2: Effective use of ICT. Our favourite digital tools. Thrive in your first 5 years of teaching! Danijela Draskovic	Calculators: how do they do that? Daniel Milutinovic	
Sessions in room They will be reco	Room 10	Using the iPad and Apple Pencil to enhance your teaching <i>Alistair Shaw</i>	Flip Out: how a flipped classroom transformed mathematics learning outcomes in a small rural town Andrea O'Connor, Andrea Skahill	Never mind the parabolics. here's the quadratic <i>Stephen Hanlon</i>		These hands-on tasks have worked for me John West	Diagnose student understanding with the effectiveness of a researcher and the efficiency of a machine Julian Lumb, Lindy Sharkey	





SESSION SUMMARY: THURSDAY (cont.)

THURSDAY 1 DECEMBER 2022

Achieving greater equity	Valuing evidence	Technology to enhance investigation
Exploring effective pedagogies	Improving individual and societal outcomes	Multiple sub-themes

	Deem	Session A	Session B		Session C	
	Room	11am-11.50am	12pm-12.50pm		1.30pm-2.20pm	2
ates only.	Room 11	Exploring pattern blocks as a tool for effective pedagogies Cassandra Lowry	A focus on primary geometry Richard Korbosky, John Lawton	Using coding to investigate patterns - TI Nspire Shelley Cross, Linda Swanepoel Major predictors of maths difficulty in kindergarten and prep Narelle Rice, Paul Swan	Using coding to investigate patterns - TI Nspire Shelley Cross, Linda Swanepoel	Pseudocode i Echo Gu
rson deleg	Room 12	Putting maths on the map Rachael Gore	The power of purposeful puzzles Andrew Lorimer-Derham		Major predictors of maths difficulty in kindergarten and prep Narelle Rice, Paul Swan	Basic facts -p major predict to 3 Narelle Rice
lable to in-pe	Room 13	Creating investigations for VCE Mathematical Methods Units 1 & 2 <i>Chris Ireson, James Mott</i>	Comparison of CAS technologies in VCE Specialist Methods examinations Neale Woods	12.50pm - 1.30pm		
;11-20 are avai	Room 14	Valuing for mathematical wellbeing Julia Hill	"Where do the rich people live?": Using the Australian 2021 Census to analyse your neighbourhood John Widmer, Robert Money		Improving individual outcomes and equity through writing in mathematics Benjamin Cooper, Samantha Horrocks	Real trigonon data Enzo Vozzo
Rooms	Room 15	Make talk central to maths class Michaela Epstein	Valuing in professional learning: Adapting teaching approaches and skills to the local mathematics classroom Wee Tiong Seah		Successfully differentiating maths lessons through content, process and product using Oxford Maths 7 10 and other tools (Year 7 to Year 10) Alex Blanksby, Thomas Christiansen, Evan Curnow	Algebra throu Doug William
	Room 16	Raising challenge in the middle years classroom <i>Leonie Anstey</i>	Life and death with sequences – VCE Brett Stephenson		The International Classroom Lexicon Project: Engaging with your professional vocabulary Kate Copping, Carmel Mesiti	Highly engag understandin Brendan Hodg



Session D
2.30pm-3.20pm
in VCE Mathematics
prevention and intervention: The ator of maths difficulty in Years 1
metry using real-time, real-world
ough geometry
ns
ging primary tasks to build ng and problem solving
lge, Russell McCartney



SESSION SUMMARY: THURSDAY (cont.)

THURSDAY 1 DECEMBER 2022

SUB-THEMES

Achieving greater equity	Valuing evidence	Technology to enhance investigation
Exploring effective pedagogies	Improving individual and societal outcomes	Multiple sub-themes

	Room	Session A	Session B		Session C	
×	Köölli	11am-11.50am	12pm-12.50pm		1.30pm-2.20pm	2
elegates only	Room 17	Problem solving - let's talk about it!!! Catherine Epstein/Rodgers, Antje Leigh-Lancaster	Rich tasks - sparking the discussion! Catherine Epstein/Rodgers	LUNCH	Design thinking and mathematics - designing human centred tasks Jennifer Palisse	Changing pra Newman's erro Kris Westcott
o in-person d	Room 18	Matrices and networks: VCE questions analysis Darren Smyth, Robert Yen	Fun with drawings using TI-Nspire and flags of the world Shane Dempsey, Raymond Rozen	12.50pm - 1.30pm	Diving into maths anxiety, for teachers and students Pete Sanders	Using visual m to deepen und mathematics Kathy Lin
0 are available t	Room 19	Effective, painless classroom teaching of secondary school algebra Peter Collins			Values alignment in mathematics education Penelope Kalogeropoulos, Angela Liyanage	Leadership an for our leaders James Dann
Rooms 1 1- 2(Room 20	Enabling and extending problem solving Derek Holton, Wendy Taylor	Building understanding of algebraic symbols with an online card game <i>Jiqing Sun</i>		Modular mastery-based learning Joel Scott	



Session D

.30pm-3.20pm

actice through the use of ror analysis

models and misconceptions aderstanding in middle years

nd mathematics: opportunities rs of tomorrow, today



SESSION SUMMARY: FRIDAY

FRIDAY 2 DECEMBER 2022

Achieving greater equity	Valuing evidence	Technology to enhance investigation
Exploring effective pedagogies	Improving individual and societal outcomes	Multiple sub-themes

	Deam	Keynote		Online session	Session E	Session F	
	Koom	9.15am - 10.15am		10.25am - 10.55am	11am-11.50am	12pm-12.50pm	
0	Room 1	Motivating students in mathematics through conceptual PlayWorlds and RealWorld situations		Using the Place Value Assessment Tool (PVAT) to guide your place value teaching in 2023	Problem solving and reasoning can build mathematical understanding and fluency – primary	Checking for understanding: achieving greater equity in the mathematics classroom Cassandra Lowry	
ate		Marilyn Fleer		Angela Rogers	Peter Sullivan		
e delega	Room 2	From problem solving and reasoning \rightarrow understanding and fluency		A school without books Doug Williams	Working smarter, not harder as a numeracy leader Angela Rogers	What is the PURPOSE of this lesson? Effectively harnessing learning intentions and Success criteria	
ı and onlin		Supported by	MORNING TEA			Jayde Cairns, Niyati Robson	LUNCH 12.50pn
available to in-person roadcasted	Room 3	Valuing and exploring how technology enhances mathematical investigation and discovery. Peter Fox, Allason McNamara, Tom Moore, Rachael Whitney-Smith	10.15am-11am (online delegates have the opportunity to attend a bonus online session that runs from 10.25am-	Creating mathematical investigations and SACS in General Maths Units 1 - 4 <i>Kevin McMenamin</i>	2021 Mathematical Methods examinations Cathy Devlyn, Allason McNamara	Fractions, decimals and percentages @ Year 7 Anthony Harradine	1.30pm
ıs in rooms 1 - 10 are ill be recorded and b	Room 4	Problem solving and reasoning can build mathematical understanding and fluency Peter Sullivan Supported by CEASIO	10.55am)	Python for VCE Maths Teachers <i>Robin Wang</i>	2023 Foundation Mathematics Units 1 - 4: An overview and information session Kevin McMenamin	Effective use of CAS technology in 2022 Specialist Mathematics exam <i>Peideng (Martin) Nie</i>	
Session They wi	Room 5	Mathematics education: changing times, changing practices Catherine Attard Supported by EssentialAssessment Assessment out Contraction mater cary		Valuing Scientific Calculators in a Changing World Barry Kissane	How to build mathematical thinking with games Michaela Epstein	Unpacking the mathematical processes in the new Australian Curriculum: Mathematics (secondary) Rachael Whitney-Smith	



Session G	Session H
1.30pm-2.20pm	2.30pm-3.20pm
Inductive reasoning Terence Mills	Mind your mathematics language! Vicky Kennard
Falling back in love with maths Bernard Kerrins	What the heck is a Rekenrek? Amy How
Generating equations and data from images produced by students Stephen Broderick	To know and grow your students throughout an ever-changing world. Jacinta Browning, Jacqueline Clark
Exploring teaching and learning of mathematical reasoning Dilys Potter, Hannah Young	Transforming functions and learning Peter Fox
Replacing traditional textbooks with innovative technology Vaughan Nikitin, Daniel O'Kane	Teaching Matrices and Networks in VCE General Mathematics Units 1-4 <i>Jess Mount</i>



SESSION SUMMARY: FRIDAY (cont.)

FRIDAY 2 DECEMBER 2022

Achieving greater equity	Valuing evidence	Technology to enhance investigation
Exploring effective pedagogies	Improving individual and societal outcomes	Multiple sub-themes

	D	Online session	Session E	Session F		Session G	Session H																					
	Koom	10.25am - 10.55am	11am-11.50am	12pm-12.50pm		1.30pm-2.20pm	2.30pm-3.20pm																					
:gates	Room 6	Problem Solving: Getting Them All Aboard Mark Ljubic, Andrew Greville	Patterns in art as mathematics enrichment Jennifer Palisse	Six of the best: our all-time favourite maths lessons Michael Minas, Rob Vingethoets	LUNCH 12.50pm - 1.30pm																						Picture books - A springboard for effective maths teaching Jennifer Bowden, Sheila Griffin	Enabling and extending prompts - are we catering for all? <i>Eamon Light</i>
Sessions in rooms 1 - 10 are available to in-person and online dele They will be recorded and broadcasted	Room 7	What is 'best practice' in 2022? What is great teaching? What are outstanding pedagogies? <i>Jennifer Bowden, Peter Saffin</i>	Visualising decimal place value to build understanding Antje Leigh-Lancaster	High yield daily routines that build mathematical understanding and discussion <i>Elizabeth Irwin</i>		Bad graphs, great examples Kate Copping	Student choice in assessment and other ideas to foster problem solving Geoffrey Menon, Ursula Parker																					
	Room 8	Worthwhile CAS calculator use in this year's mathematical methods exam 2 Kevin McMenamin	Fun with drawings using TI-Nspire, footy jumpers shapes and colours Shane Dempsey, Raymond Rozen	Concept-based learning in middle years mathematics Guanghua Wu		Foundation Mathematics: hands on experiences Marilyn Hand	Warm Ups and lesson starters to hook in your students Helen Haralambous																					
	Room 9	Integrating 'MathTask' in mid-senior level mathematics classroom: a powerful pedagogical tool to promote students' conceptual understanding and connection <i>Jiqing Sun</i>	Mathematical investigations: ideas for the new VCE Unit 1 & 2 courses <i>Peter Fox</i>	Geo-Pro, polyhedra and 20 free worksheets books Geoff Phillips		Who cares about scientific calculators? Alastair Lupton	ClassPad in Year 12 exams – generally speaking Alastair Lupton																					
	Room 10	Engineering 'Aha' Moments in Number Doug Williams	Maths in schools: national teaching and learning resources to support mathematics and numeracy Genovieve Grouios, Debbie Reinholtd, John West	Inspirations for using mathematics and coding in class activities to create artworks Georgia Gouros		Creating successful problem-solving lessons Jill Cheeseman	Cryptography in maths classroom Echo Gu, Jiqing Sun																					





SESSION SUMMARY: FRIDAY (cont.)

FRIDAY 2 DECEMBER 2022

SUB-THEMES

Achieving greater equity	Valuing evidence	Technology to enhance investigation
Exploring effective pedagogies	Improving individual and societal outcomes	Multiple sub-themes

	Room	Session E	Session F		Session G		
		11am-11.50am	12pm-12.50pm		1.30pm-2.20pm	2	
ailable to in-person delegates only.	Room 11	Questioning and dialogue in early years classrooms Carolyn McCabe, Christina Tropea	Why are we exploring differentiation? Carmel Delahunty, Judy Gregg	LUNCH 12.50pm - 1.30pm		Stronger social citizens through financial literacy: creating lasting impact James Forscutt	Why don't the Antje Leigh-La
	Room 12	The magic of learning maths socially Andrew Lorimer-Derham	Mathematics, science, and coding come together: STEM-oriented coding in Scratch and Python Sebastian Sardina, Max Stephens		Enabling learners to distinguish between measurement attributes, using variation theory <i>Heather McMaster</i>	Card games w Richard Korbo	
	Room 13	Points, lines, planes and surfaces in R3 Brian Stokes	Stop! Stop! The lesson's already dead! David Innes		Creating a culture of staff collaboration Paul Staniscia	Motivating all Marissa Cashr	
- 20 are av	Room 14	Computational thinking in problem- solving, and its application to mathematical investigation <i>Brian Lannen</i>	Poster problem clinic Doug Williams		Supporting students to communicate solutions when working with technology Lynda Ball, Scott Cameron		
Rooms 1 1	Room 15	From the ground up: how to start a numeracy network Lauren Gould, Sue Kerlin,Bernadette Pearce, Andrea Skahill, Georgia Sofra	Numero - engage and have fun with maths Julie Richards			Incorporating learning space Amy Casati, T	



$\mathop{\rm Session} H$

.30pm-3.20pm

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SESSION SUMMARY: FRIDAY (cont.)

FRIDAY 2 DECEMBER 2022

SUB-THEMES

Achieving greater equity	Valuing evidence	Technology to enhance investigation
Exploring effective pedagogies	Improving individual and societal outcomes	Multiple sub-themes

	Room	Session E	Session F		Session G	
	Room	11am-11.50am	12pm-12.50pm		1.30pm-2.20pm	2.
gates only.	Room 16		Going beyond 'share time' Ellen Corovic, Jane Hubbard	LUNCH	Teaching geometry for understanding using the MATHOMAT John Lawton	Mathology: su Sophie Matta
vailable to in-person deleg	Room 17	More details coming soon	Unlock student engagement through scaffolded mathematical reasoning Joel Townsend	12.50pm - 1.30pm	Assessing challenging tasks in the early years Jane Hubbard, Hannah Marino	Clocks, calend Tim Byrne
	Room 18	What is Pseudocode(a new learning in VCE Mathematics Study Design)? Tools and knowledge required. Sanjeev Meston	Exploring computational thinking in mathematics 7 – 10 David Leigh-Lancaster		Enhancing teachers' understanding of multiplicative thinking to support students' numeracy and future learning of key topics in mathematics <i>Mayamiko Malola, Max Stephens</i>	Valuing mathe approach James Poon, M
11- 20 are a	Room 19	Comparison of CAS technologies in VCE Mathematical Methods examinations Neale Woods	Is it merely a 'drill'? A lesson learnt from Chinese mathematics 'drill practice' <i>Jiqing Sun</i>		Exploring infectious disease models with handshakes Anthony Morphett	CAS in the Me Sanjeev Mestor
Rooms	Room 20	Good questions and good questioning: tasks in the mathematics classroom Carmel Mesiti	Rich learning tasks with first nations community links Andrew Mark		Encouraging student risk taking Deborah Murrell, Rita Nainie	



.30pm-3.20pm

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SESSION DETAILS THURSDAY 1 DECEMBER 2022

KEYNOTES: Thursday, 9.15am-10.15am

KT01 PEDAGOGIES TO AMBITIOUSLY ENGAGE EARLY YEARS STUDENTS

(Exploring effective pedagogies)

Janette Bobis, University of Sydney (F to Year 2)

For many decades researchers have systematically explored This keynote presents and discusses examples that the effectiveness of various pedagogies with the goal of improving teaching and learning. Emanating from this body demonstrate the diversity of art and mathematics of research we now know a great deal about practices for relationships relevant for secondary school teaching and more effective teaching of mathematics. But mysteries learning. Examples will be shared in which art has been surrounding why some practices seemingly work when effective or useful for engaging students in learning STEAM implemented by one teacher or in one classroom but not subjects with an emphasis on mathematics. The design and structural synergies between mathematics and art, aesthetic for another still exist. My intention in this session is not to simply present a series of 'best' or 'effective' practices for qualities of the two subjects, and the interesting backgrounds of mathematics and art will be explored. Encouraging teachers to memorise and imitate in their classrooms. Instead, I wish to raise awareness and spark discussion of what might disciplinary based education as well as transdisciplinary be the potential of an ensemble of practices that can more education, effective ways of implementing art and maths together will be shared and discussed. This draws on my ambitiously engage early years students in problem solving, and critical and creative mathematical thinking than is the experience as a visual artist and my research exploring ways to use art to enhance STEAM teaching and learning. current classroom norm.

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KT02 THE VALUE OF WORTHWHILE TASKS AS AN EFFECTIVE PEDAGOGY IN MATHEMATICS: ONLINE AND OFFLINE

(Exploring effective pedagogies)

Paul Swan, A-Z Type (Year 3 to Year 6)

In this keynote Dr Paul Swan will share some tasks that employ many High Impact Teaching Strategies. Using some simple materials, such as counters and other materials commonly found around the home, Paul will ask participants to engage in some tasks that combine all of the proficiency strands: Understanding, Fluency, Problem Solving and Reasoning all vital elements of being prepared for a changing world. Along the way Paul will share some lessons learned from using some of these tasks in a remote learning environment.

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KT03 MATHEMATICS THROUGH AN ARTISTIC EYE

(Achieving greater equity, Improving individual and societal outcomes)

Shelley Hannigan, Deakin University (Year 7 to Year 12)

Supported by





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

KT04 NIMBLE NETWORKS

(Exploring effective pedagogies)

Hayley Dureau, Victoria Academy of Teaching and Leadership (Year 7 to Year 10)

With more information and resources than ever before at our fingertips, is networking still relevant and should we bother investing time and energy into it? Hayley Dureau argues strongly yes! There's an invaluable degree of depth and insight that can be gained through dialogue, team-teaching, and observation, between mathematics educators. In this session, Hayley shares some of the opportunities and insights gained through the Teaching Excellence Program, including practical strategies for sharing and challenging thinking. The session explores examples of connections made between teachers in various contexts, settings, and sectors, and how the sharing of stories and strategies can open our minds to new ways of thinking and teaching and encourage the trailing of new ideas.

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KT05 COMPUTER PROGRAMMING IN THE MATHEMATICS CLASSROOM, GRADES 1-9: THE ONTARIO, CANADA, EXPERIENCE

(Technology to enhance investigation)

George Gadanidis, University of Western Ontario, Canada (F to Year 10)

Computer programming has been integrated in the algebra strand for all grades 1-9 of the Ontario mathematics curriculum, affecting what mathematics is taught, how it is learned, and who can do it. I will share examples of teaching and learning mathematics with computer programming across the grades, with links to publicly-accessible resources, and with a focus on bringing to life mathematics concepts and relationships through dynamic modelling. The primary goal is to teach and value mathematics, with computer programming being a representational tool where appropriate.

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ONLINE SESSION: Thursday, 10.25am-10.55am

THESE SESSIONS ARE ONLINE ONLY AND WILL RUN DURING MORNING TEA.

OT01 USING THE PLACE VALUE ASSESSMENT TOOL (PVAT) TO GUIDE YOUR PLACE VALUE TEACHING IN 2023

(Valuing evidence)

Angela Rogers RMIT University (Year 3 to Year 6)

Are you looking for a free comprehensive assessment to guide your teaching of place value in 2023? The Place Value Assessment Tool (PVAT) is a valid and reliable whole number place value paper and pen assessment for Year 3-6 students. Ange developed this assessment in her PhD research. In this session she will demonstrate how you can use the data your class or school gathers from the PVAT, to structure your planning and teaching of place value both in Term One and beyond. Ange will share ideas for moderating the data, and how creating and using a Guttman chart can assist you to analyse potential instructional gaps that may appear in your teaching of place value. You will walk away from this session with a clear understanding of how the PVAT can support your school to develop a whole school focus on place value through the use of the six aspects of place value.

OTO2 ENGINEERING AHA' MOMENTS IN NUMBER

(Exploring effective pedagogies)

Doug Williams Mathematics Centre (F to Year 6)

Calculating Changes has been engineering 'Aha' moments in number for more than 25 years. Evolving from classroom experiences shared through the network, it supports teachers to structure their classroom so 'Aha' moments happen more often. Children's number sense, concepts, skills, confidence and mathematical communication are enhanced and teachers are often surprised. If you teach K-6 this workshop is an opportunity to explore the teaching craft, classrooms, materials and activities around which Calculating Changes has developed. We will also touch on Working Mathematically with Infants, a resource that gathers the network's activities and pedagogy into 60 weeks of planned, sequenced number work through Years K-2.

OTO3 CONCRETE, REPRESENTATIONAL AND ABSTRACT PEDAGOGY

(Exploring effective pedagogies)

Jonathan Carter Hume Central Secondary College (Year 7 to Year 10)

Exploring effective pedagogies that engage students and equip them to be problem solvers, critical and creative users of mathematics. At Hume Central Secondary College, I am working through the action plan of developing the capacity of staff through teaching through the lens of Concrete, Representational and Abstract (CRA) pedagogy where we allow are students to effectively question why, and understand mathematical concepts on a deeper level.1. Integers focusing on the visual aspect of hot and cold water to provide

students the understanding that:

1 (hot water) plus -1 (cold water) cancels out.

2. Multiplication and division of fractions visually and using number lines.

3. Trig: exploration of the ratios involved with right angled triangles through application tasks prior to connecting with SOHCAHTOA.

OTO4 INTEGRATING 'MATHTASK' IN MID-SENIOR LEVEL MATHEMATICS CLASSROOM: A POWERFUL PEDAGOGICAL TOOL TO PROMOTE STUDENTS' CONCEPTUAL UNDERSTANDING AND CONNECTION

(Exploring effective pedagogies)

Jiqing Sun Deakin University (Year 10 to Year 12)

In many mid-senior level (i.e. Year 10 - 12) classroom, despite teachers understand underlining concepts and connection amongst these concepts are important, the practical teaching might be heavily 'procedure' orientated due to the pressure brought from tight curriculum timeframe and high-stake exams. In this sense, more pedagogical supports are needed so teachers are able to teach beyond 'procedures' in everyday practice. 'MathTask' provides a range of mathematical problems, and many of them are exam style questions, which can elicit deeper discussion around a particular topic. In this report, I will showcase how some of 'MathTask' problems can be utilised in everyday mid-senior level classrooms. My intention is to show how teachers can use this kind of problems as a pedagogical tool not also to cater for needs of the high-stake exam, but also enhance students' conceptual knowledge and its connection.



ONLINE SESSION: Thursday, 10.25am-10.55am

THESE SESSIONS ARE ONLINE ONLY AND WILL RUN DURING MORNING TEA

OT05 PROBLEM SOLVING: GETTING THEM ALL ABOARD

(Exploring effective pedagogies)

Mark Ljubic and Andrew Greville, St. Joseph's Secondary College Mildura (Year 5 to Year 10)

Reflections from Mark....

I was in Year 7 in 1981. What a great year to start high school. My teacher Mr Greenwell wasn't your everyday sit down and do the left-hand side of the book teacher. Instead he threw down challenges that got us thinking about the process of tackling his at times off-beat questions. His questions, although open-ended, invited responses from all members of my mixed ability class as he sat in the front of the class and teased the answers from us. Today we hope to recreate those great moments as we look at 1981 more closely. Are you ready for the 1981 challenge?

OT06 FOOTY FEUD!: DEVELOPING NUMERACY THROUGH SPORT

(Technology to enhance investigation)

Andrew Williams, Footy Feud!

(Year 3 to Year 6)

Footy Feud! is an AFL licensed card game, developed by Andrew Williams- a former school and university maths/ accounting tutor. In this session Andrew will detail how Footy Feud! has been used to great effect in primary schools across Victoria to enhance numeracy fluency of 1000s of studentsespecially six times tables, counting to 100 and strategic thinking skills. Andrew will also provide an overview of a specially designed 75min lesson plan featuring Footy Feud! which has been trialled with great success in Victorian schools during Terms 3 and 4.

OT07 WHAT IS 'BEST PRACTICE' IN 2022? WHAT IS GREAT TEACHING? WHAT ARE OUTSTANDING PEDAGOGIES?

(Exploring effective pedagogies, Valuing evidence)

Jennifer Bowden and Peter Saffin, The Mathematical Association of Victoria (F to Year 6)

What is 'best practice' in 2022? Let's explore some aspects of great teaching and outstanding pedagogies to kick off

our day. We need our students to be able to do mathematics, and value it! They need to understand why it's important, as they require it for success in everyday life. Maths anxiety and disengagement can leave students feeling that maths is disconnected from their lived experience, and that mastery is required to feel success. Traditional approaches can create pass or fail situations (think üor X) that put students under stress and make students feel they can't succeed. Good teachers mix approaches; inquiry-based learning, warm-ups, number talks, discussion and exploring the proficiencies, supported by explicit instruction, prompts, differentiation and other techniques allow teachers to select the best approach for their students at their point of need, and in a typical mixed ability classroom not all students need the same instructional approach at the same time. Let's explore techniques educators can use, and how can you add to your repertoire.

OT08 WORTHWHILE CAS CALCULATOR USE IN THIS YEAR'S MATHEMATICAL METHODS EXAM 2

(Technology to enhance investigation)

Kevin McMenamin Mentone Grammar (Year 9 to Year 12)

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

OT09 MATHS THROUGH THE MATRIX OF POETRY

(Exploring effective pedagogies)

Tom Petsinis Deakin University (Year 11 to Year 12)

I have presented my maths inspired literary work at a number of MAV conferences over the years. For the forthcoming conference I will present a reading of various mathematical poems from my new book to be published next year titled Mag(ϖ) Poems. The reading will engage participants and stimulate discussions about maths in all its facets - its history, protagonists, philosophy, practice and teaching. The presentation will endeavour to encourage teachers to use poetry, and literature in general, as matrix that broadens the teaching context and raises student awareness of the cultural underpinnings of the subject.

OT10 USING THE IPAD AND APPLE PENCIL TO ENHANCE YOUR TEACHING

(Technology to enhance investigation)

Alistair Shaw, Victory Christian College (Year 7 to Year 12)

Remote learning has encouraged many of us to rethink the way we teach our classes. MyNotebook is a free iOS app that is designed to help streamline the transition between the traditional whiteboard board and a digital platform. Through the use of an iPad and an Apple Pencil, you can write on existing documents, handwrite new notes and draw diagrams. MyNotebook has a number of built in maths objects including maths shapes and a dynamic cartesian plane. I would like to share how I have used this app as a primary teaching tool in my classroom.

Expert insights to address the gaps in Australian maths classrooms









SESSION A: Thursday, 11am-11.50am

A01 DEVELOPING A THINKING CLASSROOM: **TEACHING AND LEARNING INSIGHTS**

(Exploring effective pedagogies, Valuing Evidence)

Angela Rogers, RMIT University and Bernadette Long, Glowrey Catholic Primary School (F to Year 6)

This time last year, Peter Liljedahl presented an outstanding keynote presentation at the MAV conference. His research and work around "Building Thinking Classrooms in Mathematics" was inspiring. After watching Peter and reading his book, Ange and Bern began a guest to see how this approach could work in a school setting. This session presents the insights and learnings we gained through trialling some of Peter's 14 practices in several primary classrooms. Insights from teachers and students will be shared, as well as the practical constraints and obstacles we faced implementing this 'new' approach. Whether you are familiar with Peter's research or not, this session will provide practical ideas on how to easily and effectively begin the journey to turn your classrooms into places where students are given the opportunity to truly think deeply in mathematics.

A02 HOW IS CRITICAL THINKING VALUED IN MATHEMATICS?

(Exploring effective pedagogies)

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

Problem solving and critical and creative thinking are skills for life. Learning and teaching beliefs. classroom environment and the choice of Mathematical tasks are paramount. Through the use of Maths Talks, games and Challenging Maths Tasks learn how students have become problem solvers, critical and creative thinkers in a primary setting. This hands on workshop will offer tasks and games, look at students work samples and videos, as well as provide ideas and protocols for setting up classrooms that honour agency, problem solving and critical and creative thinkers.

A03 FURTHER MATHS EXAMS: USING THE CAS CALCULATOR EFFICIENTLY AND **EFFECTIVELY**

(Technology to enhance investigation)

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

This session will look at questions from last 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.

A04 DETAILED ANALYSIS OF CAS CALCULATOR USAGES IN 2022 VCE **SPECIALIST MATHS EXAM 2**

(Technology to enhance investigation, Exploring effective pedagogies)

Peideng (Martin) Nie, Austin Education Pty Ltd (Year 11 to Year 12)

The detailed uses of both TI Nspire and Casio CP400 CAS calculators will be discussed within the 2022 VCAA Specialist Maths Exam 2, and the featuring calculator will be TI Nspire. Similar and different features on common questions will be compared. Within the timeframe, some relevant CAS functionalities regarding the 2023 VCE Specialist maths study design will also be discussed and useful combined operations will be investigated, including vector cross product, calculating volumes, equations of lines and planes, etc. Other relevant VCAA exam questions will be referenced with appropriate adjustment in conjunction with these CAS calculator applications. A Number of CAS widgets created for vectors, Kinematics and differential equations will also be shared with the attendees. The detailed CAS usages for recent VCAA SM2 exams will be shared with all attendees.

The attendees, at the end of the presentation, will receive a PDF containing the detailed CAS uses for the 2022 Specialist Maths exam 2.

A05 ALLEVIATING ANXIETY

(Improving individual and societal outcomes, Exploring effective pedagogies, Valuing evidence)

Dietmar Schaffner, Penleigh and Essendon Grammar and Matthew Schaffner, Mac Robertson Girls' High School (Year 9 to Year 12)

This workshop explores the phenomenon of performance anxiety in mathematics. Using research literature and selected case studies of students in our respective senior schools, we try to determine the causes of performance anxiety, the effect that this has on student performance in assessment tasks and possible strategies for its amelioration. Although we describe our own experiences in dealing with

test anxiety, we also hope to generate discussion amongst delegates with a view to promoting further research.

A06 USING CARDS AND COUNTERS TO LINK **THE PROFICIENCIES**

(Exploring effective pedagogies)

David Dunstan, Association of Independent Schools of WA and Paul Swan, A-Z Type (F to Year 6)

In this presentation simple materials such as cards and (Year 3 to Year 6) counters will be used to illustrate how the four proficiency strand: understanding, fluency, problem solving and reasoning How can we maximise opportunities to collect data that may be linked with content from the number strands. focus on capturing a moment when the students are relaxed, Participants will be involved in using these materials to explore engaged and aware of what they need to know? the key facets of the proficiency strands. Participants will be In this session we will use the curriculum, learning progressions provided with support materials to help them try these ideas and a lesson structure that allocates time specifically for in the classroom.

A07 ASSESSING STUDENTS: ONE SIZE DOES NOT FIT ALL!

(Achieving greater equity, Exploring effective pedagogies, Valuing evidence)

Catherine Pearn, Carmel Mesiti and Kate Copping University of Melbourne (F to Year 8)

This workshop focuses on adapting assessment tasks to differentiate for student learning needs and assessment purposes. You will be invited to analyse sample tasks and rewrite these in different formats, for different purposes, depending on students' needs. We will explore the modification of tasks to support learners who are both successful and unsuccessful with the original task to determine the extent of their mathematical skills, knowledge and understanding. This workshop will suit teachers who would like to be supported in writing good questions or creating and planning assessment tasks.

A08 MATHS GAMES TO ENGAGE STUDENTS

(Improving individual and societal outcomes)

Helen Haralambous, Mathematical Association of Victoria (Year 7 to Year 10)

After two years of working virtually come and experience playing some Maths games with you colleagues again. Maths games are also a useful tool in engaging all students. MAV Games Days are very popular and a great way of engaging students through competing with like-minded individuals. In this hands on workshop participants will trial a selection of

games and activities, that will both engage students in the classroom, whilst also providing ideas for schools wishing to run smaller scale Games Days at a local level.

A09 PLANNING FOR MEANINGFUL FORMATIVE ASSESSMENT STRATEGIES -**INFORMING TEACHING AND LEARNING** WHILST PRIORITISING WELL-BEING

(Exploring effective pedagogies, Valuing evidence)

Emma Moore, Cowes Primary School

formative assessment. We will explore strategies that target specific data collection whilst empowering the students to identify what they know and what they can learn next. Techniques highlighted will focus on the planning for opportunities and feeding back to the students in ways that remove the stress of grades or levels but allow teachers to fulfil their reporting requirements. Students and teachers will feel confident in the knowledge that the skills required for the effective application of mathematics in life for the future are acquired in ways that emphasise the importance of the effects of well-being on achievement.

A10 FLIP OUT: HOW A FLIPPED CLASSROOM TRANSFORMED MATHEMATICS LEARNING **OUTCOMES IN A SMALL RURAL TOWN**

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies, Valuing evidence)

Andrea O'Connor, Catholic Education Sandhurst and Andrea Skahill, Marian College (Year 5 to Year 12)

The presenters will share how the use of flipped classroom pedagogy was implemented to transform student mathematical learning achievement in a small outer regional secondary school. The flipped classroom moved teachercentred instruction out of the classroom to provide more time in the classroom for visible student-centred learning. The student voice is loud and clear, the instructional videos created by Ms Skahill have boosted students' mathematical confidence and supported their learning. Greater emphasis on students' to take ownership of their learning has resulted



SESSION A: Thursday, 11am-11.50am (cont.)

in increased student agency and efficacy. The classroom is effectively differentiated to ensure all learners are working within their Zone of Proximal Development.

Mini-lessons provide explicit instruction at the point of need, while other students work collaboratively on engaging learning tasks, re-watching videos and sharing problemsolving strategies. The flipped classroom and effective differentiation of lessons has ensured all learners are provided access to the curriculum, and developed a learning culture where students are encouraged to problem solve and apply knowledge in engaging maths investigations.

A11 EXPLORING PATTERN BLOCKS AS A TOOL FOR EFFECTIVE PEDAGOGIES

(Exploring effective pedagogies)

Cassandra Lowry, St Francis of Assisi Tarneit (F to Year 6)

A popular resource in primary schools, patterns blocks are often overlooked as merely a tool to create interesting deigns. This workshop will provide opportunities for participants to explore various uses of pattern blocks, including through games, rich tasks, challenges and as a tool to support student learning. It will demonstrate how pattern blocks can be used to help students think flexibly about numbers and will provide examples of how activities can be integrated across different areas of the curriculum.

A12 PUTTING MATHS ON THE MAP

(Exploring effective pedagogies, Valuing evidence)

Rachael Gore, Albert Park College (F to Year 12)

This workshop will canvas how Albert Park College raised numeracy standards through pedagogical and curriculum interventions. Strategies for implementing individual DET initiatives into enduring whole school approaches for lasting student improvement will be showcased. Participants will leave with an understanding of how multiple staff can be mobilised as champions for change as we strive towards excellence in both learning and wellbeing for every student. How can we put "Maths on the Map" in every school?

A13 CREATING INVESTIGATIONS FOR VCE MATHEMATICAL METHODS UNITS 1 & 2

(Exploring Effective Pedagogies, Technology to enhance investigation)

James Mott, Southern Cross Grammar and Chris Ireson,



Melbourne High School (Year 11 to Year 12)

In this session, attendees will be exposed to strategies for creating and implementing "Investigations" within the revised Unit 1/2 VCE Maths Methods course. Attendees will explore sample 'starting points', and discuss how such tasks could be further adapted to suit their school context. Collaboration amongst attendees will occur in this session, and attendees are encouraged to come with ideas to share. TI-Nspire will be the main technology used in the workshop, and attendees are encouraged to bring their own TI-Nspire CX CAS.

A14 VALUING FOR MATHEMATICAL WELLBEING

(Improving individual and societal outcomes, Exploring effective pedagogies)

Julia Hill, University of Melbourne (Year 3 to Year 12)

The focus of this workshop will be on 'mathematical wellbeing' that is fulfilling one's values to feel good and functioning well in mathematics education. Wellbeing is usually approached at a whole school level (across all subjects combined) and rarely embedded into individual subjects like mathematics. Evidence suggests that teaching skills for wellbeing is most effective when it is contextualised, relevant, and integrated into existing subjects - like mathematics. This workshop will focus on various strategies to recognise and support both teachers and students wellbeing in the mathematics classroom.

A15 MAKE TALK CENTRAL TO MATHS CLASS

(Exploring effective pedagogies)

Michaela Epstein, Maths Teacher Circles (Year 3 to Year 10)

Maths is often learned and practiced in isolation. Students do written work alone, check their answers individually and receive feedback in private. What if you could change that?

What if meaningful conversation became central to maths class? Conversation that's centred on explaining ideas, listening and learning from peers, and thinking carefully about strategies. Enter Maths Talks.

In this session, attendees will learn about tried and tested Maths Talks that can be used across the curriculum and with all ages. They will receive links to resources to help with easily getting started.

A16 RAISING CHALLENGE IN THE MIDDLE YEARS CLASSROOM

(Achieving greater equity, Exploring effective pedagogies)

Leonie Anstey, Department of Education and Training (Year 5 to Year 8)

It is our professional knowledge and skill, as highly skilled educators, to facilitate learners to engage in dialogue and feedback to raise challenge in our classrooms. This hands- on session will explore selected Victorian resources, that will enhance dialogue in your middle years classroom/context. The resources will include Middle Years Mathematics Challenges and learning sequences.

A17 PROBLEM SOLVING - LET'S TALK ABOUT IT!!!

(Exploring effective pedagogies)

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

Solving problems and rich discussions are intrinsic aspects of every effective Numeracy classroom. But how can you adequately marry the two? As we have discovered, Number Talks provide a rich opportunity for all students to engage in mathematics by encouraging the students to think flexibly about numbers through sharing ideas and strategies. But why not provide this opportunity through a problem solving investigation. Many students struggle to solve problems, especially 2 step investigations, so in this workshop we will investigate strategies to solve problems through probing questions that encourage flexible thinking and reasoning.

A18 MATRICES AND NETWORKS: VCE QUESTIONS ANALYSIS

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies, Valuing evidence)

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

MaffsGuru's Darren Smyth joins forces with Nelson VICmaths' Robert Yen as they unpack some past VCE exam questions from the Further Maths (now General Maths) topics of Matrices and Networks. Hear some expert advice on reading and interpreting the questions, the allocation of marks and the worked solutions, the common areas and errors, and the student performance for those questions in those years. Learn some teaching tips and exam hacks for these topics.

A19 EFFECTIVE, PAINLESS CLASSROOM TEACHING OF SECONDARY SCHOOL ALGEBRA

(Improving individual and societal outcomes, Exploring effective pedagogies)

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

Algebra is seen as a difficult and stressful topic by too many students and too many staff. This should not be the case. It should be seen as a time saving, and maths knowledge facilitating set of interrelated skills, grounded in reality; NOT a list of increasingly abstract unconnected dot points. I ran a version of this session at the MAV conference for a number of years. I have run / shared it at schools that I have worked at. Feedback has been overwhelmingly positive, it's why l bother to present 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 pedagogy and related strategies for teaching algebra. It is one that he has used when either introducing algebra to students unfamiliar with the skill, or reintroducing it to students who have seen it before but "don't get it". The format will be a lecture, but with an emphasis on being interactive (as much as possible) This session is aimed at maths teachers who are not confident with the teaching of algebra. This may mean inexperienced teachers or teachers teaching outside their method or teachers after new ideas. It is delivered by a very experienced teacher and presenter.

A20 ENABLING AND EXTENDING PROBLEM SOLVING

(Exploring effective pedagogies, Valuing evidence)

Wendy Taylor, Sandringham College and Derek Holton, The University of Melbourne

(Year 5 to Year 10)

Inspired by the work of Pólya ("If you can't solve a problem, then there is an easier problem you can solve: find it") and John Mason: ("A Maths lesson without the opportunity to generalise is not a Maths lesson."), this session will unpack the process of taking one problem and turning it into many so that all students have the opportunity to be engaged and extended. We will share 20 problem sets suitable for use with Year 5 to Year 10 students and provide teachers with the tools to create their own. If you have problems of your own that you'd like to develop please bring them along.





SESSION B: Thursday, 12pm-12.50pm

B01 PROBLEM SOLVING - MORE THAN JUST SOLVING PROBLEMS

(Exploring effective pedagogies)

Paul Staniscia, Southern Cross Grammar (F to Year 8)

To become proficient in mathematics, students need to spend time doing mathematics (solving problems, justifying their thinking, developing understanding, practicing skills) and building connections between their previous knowledge and new knowledge. The National Research Council (2001) views Mathematical Proficiency as something that is developed through five interdependent and interwoven strands - Conceptual Understanding, Procedural Fluency, Strategic Competence (Problem Solving), Adaptive Reasoning and Productive Disposition. Therefore, Problem Solving is one piece of a much larger puzzle and is much more than just providing students with a problem solving task to complete. Using the Mathematical Proficiency Strands, this workshop will explore a Problem Solving instructional model to teach and assess mathematical proficiency through whole school moderation practices and self, peer and teacher feedback..

B02 DEVELOPING A WHOLE SCHOOL APPROACH AND SCHOOL VISION ABOUT THE TEACHING OF MATHEMATICS

(Exploring effective pedagogies, Valuing evidence)

Jessica Kurzman, St. Patrick's, Kilmore (F to Year 6)

Challenging tasks, implemented using mixed ability settings, can be an effective mode to enhance and promote student discussions which leads to reasoning and deeper understanding of mathematics concepts. The Launch Explore Summarise instructional model can support teachers to confidently set up class structures that facilitate and guide this type of learning. To develop cohesion in teaching practices across the school, all staff should be provided with opportunities to deepen their understanding of up to date research informed strategies, through school-based professional learning. Critically, this professional learning should enable teachers to be involved in the decision making and direction, rather than simply be directed by leadership. The focus of this seminar is to share a sequence of steps used to develop a whole school approach and school vision about the teaching of Mathematics. A particular focus will be on the need to influence teacher perspectives and mindsets to support the use of challenging tasks and mixed

ability settings. I will share the process used from my own setting over the past 12 months to ensure there is a deeper understanding of best practice methodology for teaching mathematics, including the success and challenges that occurred along the way.

B03 DO YOU WONDER WHAT EXPLICIT TEACHING IS IN THE MIDDLE YEARS?

(Exploring effective pedagogies, Valuing Evidence)

Sharyn Livy, Monash University, Allan Dougan, Australian Association of Mathematics Teachers and Helen Chick, University of Tasmania (Year 3 to Year 8)

The focus of this workshop is to demonstrate and discuss explicit teaching through the example of equivalent fractions. We have been working together as a team this year to discuss the most effective approaches to using explicit teaching pedagogy. During this presentation, we will share our understanding of seven essential components of explicit teaching that consider student learning needs, which supports them to make connections when problem-solving and reasoning. A goal of this approach is to provide teachers with tools for teaching students to become confident and competent learners while working on engaging problems.

B04 PROOF: A NEW TOPIC IN SPECIALIST MATHS

(Exploring effective pedagogies)

Katherine Seaton, La Trobe University (Year 11 to Year 12)

Previously students in Specialist Maths have been asked to "show that" something holds. In the new study design, this is formalized and expanded to proof by a variety of methods, with the underlying expectation of being logical and using symbols such as quantifiers and implication (=) accurately. This session will consider proof by contradiction and by induction, the use of cases in some proofs, and when proving the contrapositive statement is the best approach. Although proof is listed in a particular Topic and Area of Study, the Outcomes makes it clear that students can be asked to prove concepts from any of the Areas of Study, so examples will be drawn from across the various Areas.



SESSION B: Thursday, 12pm-12.50pm (cont.)

B05 USING NAPLAN QUESTIONS TO HELP INFORM YOUR TEACHING

(Exploring effective pedagogies, Valuing evidence)

Nadia Abdelal, EM Maths Consulting (Year 3 to Year 10)

NAPLAN is made up of some great questions that can be used in many ways to help inform our teaching and to develop our students' ability to successfully solve problems. In this workshop, I will talk about how using NAPLAN questions as warm-ups have helped teachers to understand their students better. Along with problem-solving, we will talk about how these types of questions can be useful as formative assessments as well as make student misconceptions about a topic more apparent.

B06 ENHANCING STUDENT ENGAGEMENT THROUGH CREATIVE PROBLEM SOLVING, A COMMUNITY OF PRACTICE

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies, Valuing evidence)

Jennifer Bowden, Mathematical Association of Victoria and Megan Teefey, Victorian Department of Education (F to Year 8)

As a CoP we used student surveys and networkwide data to create a Theory of Practice; If we have improvement of practice in 'Creative Problem Solving' then our students will demonstrate increased engagement as math learners. Over 2022 the CoP has worked together to use evidenced based resources to improve the teaching and learning of creative and critical thinking and problem solving across our schools. This is through effective planning, quality resources, emerging technology and engaging tasks. Working together, sharing resources and practice with the support of MAV Consultants we have improved the outcomes for students, teachers and leaders. Location and isolation could mean that Alpine – Towong Network schools have challenges improving social outcomes and equity for students, we would love to share how we have overcome this to achieve success.



B07 FIRST 10 DAYS OF MATHS: ESTABLISHING A CONSISTENT LEARNING CULTURE ACROSS YOUR SCHOOL

(Achieving greater equity, Exploring effective pedagogies)

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

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

B08 MATHEMATICAL METHODS EXAM 2-2022 SOLUTIONS ON CAS (TI NSPIRE)

(Exploring effective pedagogies, technology to enhance investigation)

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

This session will demonstrate the efficient and effective use of CAS technology to respond to Multiple choice and Extended response questions of the VCAA 2022 Methods examination. Although, this session will use the TI Nspire CX-CAS technology, the same process with slight variations can be used with other CAS technologies permitted by VCAA. The session will suit current or teachers intending to teach the Methods course in 2023.

B09 NEW TEACHER SERIES, PART 1: EFFECTIVE AND POWERFUL PEDAGOGICAL APPROACHES. THRIVE IN YOUR FIRST 5 YEARS OF TEACHING!

(Improving individual and societal outcomes)

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

Important: This is part 1 of a special 2-part series aimed to assist new teachers in navigating their first five years in the classroom. 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. 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 2-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.

B10 NEVER MIND THE PARABOLICS. HERE'S THE QUADRATICS

(Exploring effective pedagogies)

Stephen Hanlon, Braemar College (Year 9 to Year 10)

This workshop draws on some themes of a Year 9&10 elective subject that I teach each semester at Braemar College called Maths, Magic & More. You will learn a couple of playing card tricks that rely on the binary number system, see how solving equations in different bases use quadratic equations, watch how a parabola was used to make a popular music video and why satellite dishes are parabolic using a little "origami". Hopefully you will take away some ideas and activities that can be used in the classroom to either introduce the topic, demonstrate why the parabola is so important or just spice up a lesson.

B11 A FOCUS ON PRIMARY GEOMETRY

(Exploring effective pedagogies)

Richard Korbosky and John Lawton, Objective Learning Materials (F to Year 6)

A focus on primary geometry. Geometry understanding is sometimes overlooked in primary school years causing students to carry misconceptions into lower secondary years. The Mathomat Primary and the Mathomat Primary Whiteboard are unique drawing tools that have a challenging and diverse collection of geometric 2 D shapes and 3 D shapes which focus on spatial language and a rich set of number lines. During this mathematics session Richard Korbosky and John Lawton will lead participants through a series of activities with the Mathomat Primary resources that are designed to create a deep and more flexible understanding of shape properties, transformational geometry and spatial drawings for P-6 classrooms. Commercial Presentation

B12 THE POWER OF PURPOSEFUL PUZZLES

(Improving individual and societal outcomes, Exploring effective pedagogies)

Andrew Lorimer-Derham, Think Square (Year 3 to Year 8)

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 discussing key principles for creating rich, engaging activities. During this workshop participants will learn how maths puzzles can be designed for intentional fun, test their skills solving a range of different puzzles and produce their very own mathematical puzzle.

B13 COMPARISON OF CAS TECHNOLOGIES IN VCE SPECIALIST METHODS EXAMINATIONS

(Technology to enhance investigation)

Neale Woods, Retired (Year 11 to Year 12)

In this workshop, Neale Woods will present a series of VCE Specialist Mathematics Examination 2 questions comparing solutions obtained using TI-Nspire CAS and Casio ClassPad. As time is vital in these examinations, the emphasis will be on those questions where students using one technology have a time advantage over students using the other technology. The session will be a presentation but participants will be encouraged to discuss and provide alternative solutions.



SESSION B: Thursday, 12pm-12.50pm (cont.)

B14 "WHERE DO THE RICH PEOPLE LIVE?" -USING THE AUSTRALIAN 2021 CENSUS TO ANALYSE YOUR NEIGHBOURHOOD

(Achieving greater equity, Improving individual and societal outcomes, Technology to enhance investigation, Exploring effective pedagogies)

John Widmer, Mag-Net STEM Educators and Robert Money, consultant (Year 7 to Year 12)

The Australian Census is conducted every five years. It is used to allocate Parliamentary seats to the Australian House of Representatives. It is, therefore, a fundamental part of our democracy. It is also a rich source of "fine-grained" information about the citizens who live near you, the families that attend your school and the sociological characteristics of remote and regional Australia. The presenter has used the big data contained in the Census in his own VCAL classes. He has run Conference workshops that stretch the use of spreadsheets and mathematical modelling tools such as Mathematica. Workshop participants will use the ABS Quickdata setup to retrieve Census data for their own street and for their school. It is hoped that participants will continue to work with colleagues in the STEM community. Participants are encouraged to bring their own questions about their neighbourhood and not rely on the provocative title of this presentation. It is hoped that attendees will begin to see how much "real" free data exists online and how they can stop using "fake" data from the textbook or the set curriculum.

B15 VALUING IN PROFESSIONAL LEARNING: ADAPTING TEACHING APPROACHES AND SKILLS TO THE LOCAL MATHEMATICS CLASSROOM

(Exploring effective pedagogies)

Wee Tiong Seah, Melbourne Graduate School of Education, The University of Melbourne (Year 3 to Year 10)

Teachers learn, try out, and put into practice new mathematics teaching approaches and skills on an ongoing basis, as the professional context of their work shifts and evolves with every lesson taught. These professional learning experiences need not be in the form of formal courses or professional development workshops; they can be acquired through media posts or impromptu sharing amongst colleagues. Often, however, they do not end up enriching teachers' professional repertoire either because they are thought to be impractical in the local context, or because they do not seem



B16 LIFE AND DEATH WITH SEQUENCES - VCE

(Technology to enhance investigation)

Brett Stephenson, Guilford Young College (Year 11 to Year 12)

This workshop will investigate recursive sequences that often model life and death situations and exhibit order/pattern and/ or chaos. A Casio graphing calculator (Classpad 2) will be used to investigate how the behaviour of the sequences can be tabulated, graphed and subsequent patterns discovered and analysed for the underlying order and chaos. The use of other technologies such as Desmos and Excel will be demonstrated and you should be prepared to accept that there are other constants in mathematics other than PI and e. Specialist Maths Unit 1 Area of Study 2

- sequences and series as maps between the natural numbers and the real numbers, the use of technology to generate sequences and series and their graphs, and sequences generated by recursion, including arithmetic and geometric sequences
- limiting behaviour as n → ∞ of the terms tn in a geometric sequence, the sum of the first n terms Sn and their dependence on the value of the common ratio r

General Maths Unit 1 and 2 Area of Study 3 $\,$

- the use of a first-order linear recurrence relation to model linear growth and decay, including the rule for evaluating the term after n periods of linear growth or decay
- the use of a first-order linear recurrence relation to model geometric growth and decay, including the use of the rule for evaluating the term after n periods of geometric growth or decay
- Fibonacci and related sequences and their recursive specification.

Key skills

- use a given recurrence relation to generate an arithmetic or a geometric sequence, deduce the rule for the nth term from the recursion relation and evaluate
- use a recurrence relation to model and analyse practical situations involving discrete linear and geometric growth or decay

formulate the recurrence relation to generate the Fibonacci sequence and use this sequence to model and analyse practical situations.

B17 RICH TASKS - SPARKING THE DISCUSSION!

(Exploring effective pedagogies)

Catherine Epstein/Rodgers, St Peter's East Bentleigh (F to Year 6)

Rich tasks engage students, spark curiosity and promote rich discussion. Rich, effective discussion happens when students construct mathematical understandings through listening to and sharing ideas and strategies. Together we will investigate a number of rich tasks, across the strands, that allow for a range of mathematical perspectives that can be explored through rich discussion.

B18 FUN WITH DRAWINGS USING TI-NSPIRE AND FLAGS OF THE WORLD

(Technology to enhance investigation)

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

No not Sheldon Cooper, fun with TI-Nspire. The latest version of TI-Nspire has intrinsic functions to draw and fill shapes. In this hands-on session we will use TI-Nspire to write programs to draw some of the flags of different countries of the world. Come along to this colourful activity and use coordinate geometry, learn STEM concepts and programming skills. Please bring along a TI-Nspire CX II CAS calculator, or your laptop with TI-Nspire.



B20 BUILDING UNDERSTANDING OF ALGEBRAIC SYMBOLS WITH AN ONLINE CARD GAME

(Technology to enhance investigation, Exploring effective pedagogies)

Jiqing Sun, Deakin University (Year 5 to Year 8)

Transition between arithmetic and algebraic thinking is challenging for students. One notable difficulty for students is understanding algebraic symbols—pronumerals. For instance, students treat letters as representing specific objects rather than indeterminate quantities, such as "a" is for "apples" and "b" is for "bananas". Students also possibly assign numeric values to letters based on the alphabetical order (e.g., considering "a" is 1 since it is the first letter). Furthermore, some students are challenged by the coefficients of letters (e.g., students mistakenly consider "2h" is "2+h"). The incomplete understanding of the coefficient system might contribute to students' difficulty around the manipulation of algebraic expressions (e.g., collecting like-terms). Many researchers and teachers are exploring pedagogical approaches in seeking to address this issue. The current presentation is to contribute one pedagogical approach on how an online card matching game-based learning activity supports students' understanding of pronumerals.



SESSION C: Thursday, 1.30pm-2.20pm

C01 DO YOU WONDER WHAT EXPLICIT TEACHING IS IN A PRIMARY MATHEMATICS CLASSROOM?

(Exploring effective pedagogies, Valuing evidence)

Sharyn Livy, Monash University, Allan Dougan, Australian Association of Mathematics Teachers and Helen Chick, University of Tasmania (F to Year 6)

The focus of this workshop is to demonstrate and discuss explicit teaching by focusing on intuitive strategies. We have been working together as a team this year to discuss the most effective approaches to using explicit teaching pedagogy. During this presentation, we will share our understanding of seven essential components of explicit teaching that consider student learning needs, which supports them to make connections when problem-solving and reasoning. A goal of this approach is to provide teachers with tools for teaching students to become confident and competent learners while working on engaging problems.

CO2 USING MATHS TALKS TO BUILD NUMBER SENSE AND TRANSFORM THE MATHS LEARNING EXPERIENCE

(Exploring effective pedagogies)

Alex Box, Education Specialist (F to Year 8)

Maths talks are 5-15 minute purposefully crafted collaborative conversations that create authentic opportunities for mathematical thinking. This session is an introductory focus on maths talks - what they are, why they are important and how they can help to transform the maths learning experience for students, and the teaching experience of teachers! This session will explore three different kinds of maths talk, clarify their purpose and provide resources and ideas for classroom implementation. The pedagogical ideas will be appropriate for teachers who want to foster mathematical proficiency and help bust commonly-held and damaging myths about maths.

these representations and their applications, and shares some related resources. CO4 PROBLEMS WORTH CODING - PSEUDO **CODE & ALGORITHMIC THINKING**

(Exploring effective pedagogies, Technology to enhance investigation)

C03 FOUNDATION MATHEMATICS UNITS 3

AND 4 - INTERESTING DATA GRAPHS

(Improving individual and societal outcomes)

The new Foundation Mathematics Units 3 and 4.

for implementation from 2023, includes the study

and application of a broader range of interesting data

representations commonly used in business and industry,

such as bubble, Mekko, radar, sunburst, heat map and stacked

area charts. This session provides a practical introduction to

(Year 11 to Year 12)

David Leigh-Lancaster, Leigh Lancaster Consulting

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

What is pseudo code and algorithmic thinking? The first session of "Problems Worth Coding" was held at the MAV 2016 annual conference. Three additional sessions containing a range of different problems have been covered since. With pseudo code and algorithmic thinking now forming part of the senior mathematics curriculum, it's time to take a reflective journey and revisit some of the great problems that have been covered (plus a few new ones), with a flavour of pseudo code and corresponding algorithms. The problems covered in this session have a strong mathematical flavour.

C05 HOW WE TAUGHT YEAR 7 MATHS AT **SANDRINGHAM COLLEGE IN 2022**

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies)

Wendy Taylor, Sandringham College (Year 7 to Year 8)

This year at Sandringham College we introduced a fully differentiated curriculum. Our goals were to ensure all students had the opportunity to feel success and be appropriately challenged. To support students' learning of the specific skills within our program we created our own textbook, online instructional videos for all skills and homework sheets that continue to review previously taught

skills to increase retention. This presentation will unpack the creation and implementation; how we decided on our curriculum, how resources were created, what worked well and what we will be refining for next year. We happily share our resources via the website mathsquad.org/sc-7.

CO6 LAUNCH. EXPLORE & SUMMARISE-TIPS FOR IMPLEMENTING A NEW **INSTRUCTIONAL MODEL**

(Achieving greater equity, Exploring effective pedagogies)

Michael Minas, Love Maths (F to Year 8)

In this workshop, we examine the Launch-Explore-Summarise instructional model. What are the key features of this approach to structuring a maths lesson and how does it differ from other, more traditional lesson structures? Attendees will participate in a modelled lesson, allowing them to gain a deeper understanding of the benefits of using this approach. We will also discuss issues such as student agency, differentiation, teacher questioning and perhaps most importantly- student engagement. Each participant will leave with a clear understanding of how to lead the implementation of the Launch-Explore-Summarise instructional model at your own school.

C07 LEARNING SEQUENCES TO SUPPORT AND INSPIRE TEACHERS F TO Y4

(Exploring effective pedagogies)

Dianne Liddell, Engage Empower Educate (F to Year 4)

This session aims to outline a collaborative project between the Department of Education and a team of MAV consultants in researching, drafting and creating a folio of Learning Sequences, targeted at Foundation to Level 4. The brief of this project was to support teachers in delivering high-quality lessons that are relevant, contemporary, and targeted to students' varied needs. Each Sequence consists of rich and engaging teaching and learning activities that address specific aspects of the Victorian Curriculum: Mathematics. By providing insight into the development of Learning Sequences, this session aims to support and inspire teachers to design learning experiences that promote greater conceptual development, by exploring the curriculum through an interconnected web of mathematical big ideas and concepts.



C08 META-COGNITION SKILLS: SUPPORTING SENIOR MATHEMATICS **STUDENTS**

(Exploring effective pedagogies)

Rohani Mohamad, Minaret College (Year 11 to Year 12)

This presentation focuses on meta-cognition skills as defined in one of the areas within the "Critical and Creative Thinking" capabilities. These skills would enable students to understand, manage, and reflect on their thinking and learning processes. At senior mathematics level, we explored how our students have been trained to develop and/or enhance their meta-cognitive skills over the years 2021-2022, during and after Covid pandemic years. The adapted strategies to support students learning such as guestioning, explicit teaching, and modelling of thinking throughout this journey are captured. Students' perspectives and reflections on the effectiveness of these strategies, virtually and physically, were gathered. The involved teacher and selected students will share their findings at the presentation.

CO9 NEW TEACHERS SERIES PART 2: EFFECTIVE USE OF ICT. OUR FAVOURITE DIGITAL TOOLS. [THRIVE IN YOUR FIRST 5 YEARS OF TEACHING!]

(Technology to enhance investigation)

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

Important: This is part 2 of a special 2 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. 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 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 stay connected to a safe community of learners. Technology can be one of your greatest teaching tools. No doubt since we



SESSION C: Thursday, 1.30pm-2.20pm (cont.)

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.

C10 THESE HANDS-ON TASKS HAVE WORKED FOR ME

(Exploring effective pedagogies)

John West, Mathematical Association of Western Australia (MAWA) (Year 5 to Year 10)

In this workshop we will explore some of the best hands-on ideas I've collected over the past 20 years for engaging students with particular aspects of the mathematics curriculum. Many of these ideas have been inspired by Sullivan's Launch-Explore-Summarise approach and the work of Doug Clarke and Charles Lovitt. I'm a big fan of number puzzles and problem solving and hopefully will be able to share with you some ideas that have worked for me in my work with students, teachers and in the WA Mathematics Problem Solving Program that MAWA runs in partnership with the Australian Maths Trust.

C11 USING CODING TO INVESTIGATE PATTERNS - TI NSPIRE

(Technology to enhance investigation)

Shelley Cross and and Linda Swanepoel, St Hilda's School (Year 7 to Year 10)

This hands-on workshop will examine the '10 minutes of Code' principle using the TI Nspire Graphics calculator. We will write code on the calculator for a variety of formulae used across the middle school, and use the data collected to investigate any patterns in the data. These numerical patterns will be further investigated graphically, linking them to functions such as linear, guadratic or exponential. You will be able to take away ideas ready to implement in your classroom. This session links basic coding to relevant applications in mathematics, and will develop fluency in working with formulae. No experience in writing code is required. **Commercial Presentation**

C12 MAJOR PREDICTORS OF MATHS DIFFICULTY IN KINDERGARTEN AND PREP

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies, Valuing evidence)

Narelle Rice, Bond Blocks and Paul Swan, A-Z Type (F to Year 2)

This session specifically focuses on maths for students who are 4 and 5 years old. The presenter will share the top five predictors of difficulties in maths, identified by research, for students who are 4 and 5 years old and outline evidenceinformed, strategies to help address these. Also, she will share two resources she has co-written with Dr Paul Swan to support teachers of these years to address these predictors: "Counting to 10 with Bond Blocks: Pre-Foundation" and "Counting to 20 with Bond Blocks: Foundation"

The activities in these resources fit within the VEYLD Framework and include:

- Student led play using the Introductory Activities.
- Guided play using the Activity Cards.
- Teacher led instruction using the Counting Activities. The resources include Assessment Counting Skills Checklists to monitor progress and are linked to the Australian Curriculum and Victorian Curriculum (Levels A to D) to support students with learning disabilities.

This is a commercial session.

C14 IMPROVING INDIVIDUAL OUTCOMES AND EQUITY THROUGH WRITING IN MATHEMATICS

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies)

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

This presentation will explain one Mathematics Department's journey through using VCOP and other writing strategies to improve student outcomes in response to a whole college writing initiative . We will share our approaches used to help students write about their work in responses to learning, explanations and investigations. We will share how this has affected our student outcomes and our approaches to teaching and learning in the classroom.

C15 SUCCESSFULLY DIFFERENTIATING MATHS LESSONS THROUGH CONTENT. **PROCESS AND PRODUCT USING OXFORD** MATHS 710 AND OTHER TOOLS

(Exploring effective pedagogies)

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

Implementing differentiated learning in maths classrooms is can be used to facilitate collaborative classrooms with a focus often spoken about, but seldom applied consistently across on building 21st century skills. Further, it promotes creative classes or in a practical manner. Teachers may find themselves and innovative thinking in students, as well as help build their under time constraints, without the resources they need, personal and social skills. In this session, we will use design or may be unsure of how to support remedial students or thinking principles to create some mathematics tasks with a those in need of extension. Adding critical thinking or open human-centred focus. tasks can feel overwhelming and asks teachers to establish outcomes that can be hard to assess and measure. Oxford This workshop is intended for teachers who have no prior Maths 710 has been designed to specifically help maths knowledge of design thinking and a brief introduction to the teachers provide effective differentiation in their classrooms process will be included. Design thinking can be used at all Join education experts Thomas Christiansen, Alex Blanksby year levels, primary to secondary, and is particularly useful for and Evan Curnow as they discuss strategies for addressing cross-curricular units and assessing the capabilities. gaps in understanding and successfully differentiating maths lessons in Years 7-10.

C16 THE INTERNATIONAL CLASSROOM LEXICON PROJECT: ENGAGING WITH YOUR **PROFESSIONAL VOCABULARY**

(Exploring effective pedagogies, Valuing evidence)

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

The International Classroom Lexicon Project set out to document the actual terms by which mathematics teachers in different countries named the practice in their respective classrooms. These are the words that teachers use to talk about the classroom; in Australia examples of such terms include feedback, differentiating, scaffolding, explaining and worked example. In this workshop you will engage in sorting activities with your peers to reflect on the practices you consider essential and reasons why. You will learn about the terms that mathematics teachers in other countries use, such as: työrauha (Finnish); bansho (Japanese); and mise en comun (French). Engaging with this language, the professional vocabulary of our mathematics teaching community, provides us with the opportunity to understand classroom practice at a much deeper level. Having a common and consistent language can help your school to build a cohesive approach to discuss mathematics teaching practice within your school.



C17 DESIGN THINKING AND MATHEMATICS - DESIGNING HUMAN CENTRED TASKS

(Exploring effective pedagogies, Improving individual and societal outcomes)

Jennifer Palisse, Monash Tech School (Year 5 to Year 8)

Design thinking is a problem-solving framework with an emphasis on solving non-trivial problems of social significance. When applied in the classroom, design thinking

C18 DIVING INTO MATHS ANXIETY, FOR TEACHERS AND STUDENTS

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies, Valuing evidence)

Pete Sanders, Maths Teachers Make a Difference Consultancy (F to Year 10)

As part of my research at tertiary level I interviewed preservice primary teachers about their successes, difficulties and anxieties with and about mathematics. The stories I was told were fascinating and resonated with my own experiences of Maths anxiety amongst primary teachers and students. This presentation tells the stories of some of these students' mathematical journeys from as far back as their own primary school maths education, through secondary to adult numeracy experiences. The implications of these stories for in-service teachers and students, particularly those who may be maths anxious (or have colleagues who may be!), or have negative attitudes about mathematics will be explored, as will the broader messages for mathematics education.



SESSION C: Thursday, 1.30pm-2.20pm (cont.)

C19 VALUES ALIGNMENT IN MATHEMATICS EDUCATION

(Exploring effective pedagogies, Valuing evidence)

Penelope Kalogeropoulos, Monash University and Angela Liyanage, Salesian College (F to Year 8)

Teaching and learning mathematics is a social process. Every student is an individual, and every class has its unique attributes. Effective teachers respond to the differences between what they value and what their students value by orchestrating values alignment in the classroom, such that teaching and learning can proceed in a harmonious manner. In this workshop we present two surveys that could be used to identify teacher and student values. Learning activities that represent different values will be presented alongside value alignment strategies; a professional craft that promotes engagement in mathematics learning.

C20 MODULAR MASTERY-BASED LEARNING

(Exploring effective pedagogies, Valuing evidence)

Joel Scott, The University of Queensland (Year 7 to Year 12)

The concepts underpinning Mastery-Based Learning have a history going back at least 100 years. Brought to prominence in the second half of the 20th century, the development of the practical resources required to implement such ideas has been a challenge since their conception. The last decade has seen exceptional growth in this area with tools being provided in a variety of models claiming inspiration from the original papers by Benjamin Bloom. This talk has two foci, firstly a research project looking at the relationships between established educational benchmarking systems and the diagnostic and assessment process of some commonly used online Modular Mastery-Based tools. The key goal of this project was to consider what relationships exist between Rasch models, assessing a 'mathematical capability' latent trait and the directly curriculum linked assessment within these online tools. The plan being to begin to evaluate the validity of the measures of student performance provided by these systems. The hope is that the relationships will shed some light on how useful these real time data points are and how teachers can better leverage that information to support student learning. The second project has looked at implementing some aspects of Mastery-Based learning within a foundational mathematics course at the University of Queensland.

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SESSION D: Thursday, 2.30pm-3.20pm

D01 EVIDENCE-BASED MULTIPLICATION IN THE CLASSROOM

(Improving individual and societal outcomes)

Michael Nelson, Drysdale Primary School (Year 3 to Year 8)

Multiplication and multiplicativity thinking remains the most important factor in the development of students mathematical knowledge and is responsible for the gap in understanding within classrooms. This presentation goes beyond just the theory and focuses on how teachers can deliver an evidence-based multiplication in their classrooms, including rich and engaging tasks, assessment tasks and how to build materials and manipulatives into normal lessons.

DO2 UNPACKING THE MATHEMATICAL PROCESSES IN THE NEW AUSTRALIAN CURRICULUM: MATHEMATICS (PRIMARY)

(Technology to enhance investigation, Improving individual and societal outcomes)

Rachael Whitney-Smith, Australian Curriculum Assessment and Reporting Authority (ACARA) (F to Year 6)

This workshop is aimed at unpacking the mathematical processes in the new Australian Curriculum: Mathematics version 9.0. The problem-solving and investigation processes of Mathematical modelling, Computational thinking, Statistical investigation and Probability experiments and simulations are now explicitly included as essential learning in content descriptions and achievement standards in the revised Australian Curriculum: Mathematics and references to the use of digital tools are made throughout the curriculum document. Workshop participants will be provided with some of the background information for their inclusion, examples of how the mathematical processes can be developed in practice, links to existing resources and an opportunity for discussion about what impact this new content will have on curriculum planning, classroom pedagogy and assessment in Primary.

D03 INFINITE THINGIES

(Technology to enhance investigation)

Anthony Harradine, Potts Baker Institute, Prince Alfred College (Year 7 to Year 10)

How can a simple scientific calculator help to fuel a lovely investigation that leads to students making sense of recurring decimals and various other infinite thingies. As well as a lot of fun, the investigation is dripping with delicious mathematics. You will enjoy the experience.

D04 FREE INNOVATIVE FINANCIAL LITERACY RESOURCES FROM FBF

(Improving individual and societal outcomes)

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 financial life skills.

In 2021/2022, FBF and Griffith University undertook a research piece on the financial literacy of Young Australians. This workshop will focus on the practical application of this research, including the practical application of financial literacy as a learning context in the mathematics curriculum.

The session will further explore FBF's mathematics focussed financial literacy WebQuests, developed to help teachers dealing with COVID-19 disruption, and ESSI Money, an interactive online game delivered in an innovative app-based environment. When playing ESSI Money, students practice a wide range of real-life earning, saving, spending and investing and experience the financial consequences in a safe, fun and challenging way.

Freely downloadable Blackline Masters style 'offline' classroom resources for financial literacy education will also be showcased.

All FBF resources are mapped to the Australian Curriculum and provided free of charge to Australian educators.

D05 HOW DO YOU PREPARE LEARNERS FOR REAL-WORLD PROBLEM SOLVING IN A COMPUTATIONAL AGE?

(Exploring effective pedagogies, Technology to enhance investigation)

Kelly Lean and Alec Titterton, Wolfram Research (Year 5 to Year 12)

For 10 years, Wolfram Research has been developing a methodology framework and delivery platform for training learners at all stages in computational thinking skills. This presentation will outline the framework for building a computer-based curriculum; taking modern, relevant, problems and using them in a blend of experiential and constructivist learning to enable learners to gain crucial skills that are lacking from current mainstream curricula around the world. Using a range of examples from Primary to High school, the delivery platform for the learning will be demonstrated, showing how teacher-learner interactions are supported and how learners can be creative within the materials allowing them to explore their own directions and methods of investigation.

D06 A FEW OF OUR FAVOURITES; MATHEMATICAL TASKS AND TIPS!

(Achieving greater equity, Exploring effective pedagogies)

Jennifer Bowden, Mathematical Association of Victoria and Ellen Corovic, Corovic Consulting (F to Year 6)

They're back! Join Ellen and Jen as they reunite to share with you a few of their favourites. In this session the presenters will take you on a journey to explore a selection of their favourite mathematics tasks and tips. Harnessing their many years as education consultants and drawing upon evidence-based practices this session will focus on effective mathematics pedagogies and collaboration. Join us for an engaging workshop and some favourites.

D07 MATHEMATICS FOR SOCIAL JUSTICE

(Achieving greater equity, Improving individual and societal outcomes)

Jenna Dore, St Francis Xavier College (Year 5 to Year 10)

How many times have you heard the following from your students? When will I ever use this? I don't need maths. I'm



not a maths person. My mum and dad couldn't do maths either. Traditional methods of teaching mathematics teacher-centered and rote-learning based - favour particular social demographics. Higher level mathematics education and math-intensive fields lack cultural diversity and are under-represented by females and individuals from low socioeconomic backgrounds. Adults with high numeracy proficiency are more likely to be employed and have a higher income than their low proficiency counterparts. In short, traditional maths education continues the cycle of social injustice. Social justice mathematics presents students with real life and relevant data which relates to the very issues that lead to such inequality in the first place. Students are given the opportunity to see themselves in math education and understand the relevancy maths has in their lives. This presentation will: - Help you identify maths which inhibits inclusive education - Provide you with practical examples of social justice mathematics you can use in the classroom Demonstrate where Social Justice Mathematics fits into the Australian Curriculum - Showcase successful examples of Social Justice Mathematics in action.

D08 EQUIVALENT FRACTIONS: FROM CUISENAIRE RODS TO CALCULUS

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies)

Stephen Paatsch, University High School (Year 7 to Year 10)

Equivalent Fractions are introduced to students in Victoria at Level 4 in the current Victorian Curriculum (Mathematics). Equivalent Fractions are then referred to in Level 6 (fractions with related denominators) and Level 7 (comparing fractions using equivalence). Often, this topic is treated as a simple exercise to be completed before moving students on to further fraction work. However, I believe that Equivalent Fractions are relevant to so much of the secondary mathematics course and that they should be explicitly referred to throughout our students' work. My presentation will emphasise the importance and use of Equivalent Fractions in numerous topics from Year 7 all the way through to the highest level of VCE Mathematics. Multiple examples will be provided at all levels and teachers will be provided with concrete examples that can be incorporated both implicitly and explicitly from Year 7 onwards. Year 7-10 Maths teachers (in particular those teachers not trained to VCE level)



SESSION D: Thursday, 2.30pm-3.20pm (cont.)

D09 CALCULATORS: HOW DO THEY DO THAT?

(Technology to enhance investigation)

Daniel Milutinovic, Independent (F to Year 10)

Explore some of the algorithms underpinning calculators, including arbitrary precision arithmetic and programming. Also consider computer-aided assessment and how this can be used to improve numeracy skills in younger students as well as knowledge of other areas of mathematics for older kids. PLEASE NOTE: This is not on any commercially available calculator, rather on a custom calculator that can be built from readily available parts.

D10 DIAGNOSE STUDENT UNDERSTANDING WITH THE EFFECTIVENESS OF A **RESEARCHER AND THE EFFICIENCY OF A** MACHINE

(Valuing evidence)

Lindy Sharkey and Julian Lumb, Pearson (Year 5 to Year 10)

In this presentation we will demonstrate how simple it is to accurately diagnose a student's level of understanding using Pearson Diagnostic. The Pearson Diagnostic quizzes use sophisticated algorithms to determine each learner's initial level of understanding. Based on their results, each student is assigned personalised targeted activities with a focus on critical thinking and concept development. The innovative guizzes were developed using over 30 years' worth of Australian and International academic research by the University of Melbourne. The guizzes were developed with the vision to improve mathematics teaching through better pedagogical content knowledge and the broader and more effective use of formative assessment. This is a commercial presentation.

D11 PSEUDOCODE IN VCE MATHEMATICS

(Exploring effective pedagogies, Technology to enhance investigation)

Echo Gu, Lauriston Girls' School (Year 9 to Year 12)

Algorithms attracts great attention in the discussion of revised VCE Mathematics study design. This session aims to help teachers and students develop the skills of understanding pseudocode, express algorithms using pseudocode, and become more confident in interpreting unfamiliar pseudocode. It will explore some algorithms that are relevant to areas of study from Mathematical Methods and Specialist Mathematics. Pedagogical advice will be provided and discussed.

D12 BASIC FACTS -- PREVENTION AND INTERVENTION: THE MAJOR PREDICTOR OF MATHS DIFFICULTY IN YEARS 1 TO 3

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies, Valuing evidence)

Narelle Rice, Bond Blocks (F to Year 6)

Do you have students who add or subtract by counting in ones? If so, this session is for you.

- Narelle will begin by sharing the major predictor of maths difficulties in this age group.
- Then she will outline evidence-informed strategies to help address these.
- Finally, she will share how the Bond Block system she has co-created with Dr Paul Swan will support teachers to address these predictors:

Bond Blocks is a whole school system made up of readyto-go, sequenced resources to build a firm foundation in addition and subtraction. The Bond Blocks Core Intervention Kit is a resource of over 100 sequenced activities. It follows a Concrete-Representational-Abstract Approach to comprehensively build understanding, fluency and reasoning with basic addition and subtraction including application to related pre-algebra and word problems. This resource sequentially covers every addition and subtraction content descriptor from Years 1 to 3.

The Bond Blocks system has two uses:

1) Mental Maths for Years 1 to 3

2) As a Maths Intervention Support Program for Years 1 to 6

This is a commercial session

D14 REAL TRIGONOMETRY USING REAL-TIME, REAL-WORLD DATA

(Technology to enhance investigation)

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.

D15 ALGEBRA THROUGH GEOMETRY

(Exploring effective pedagogies)

Doug Williams, Mathematics Centre (Year 7 to Year 10)

A square is X. A guadrant with a radius the same length as a side of the square is Y. Now geometry connects to algebra. The concept of a pronumeral, adding and subtracting like terms, the distributive law and linear factorisation all follow, mostly by asking the mathematician's question: "Can I check this another way?". You will be using materials based on the work of Geoff Giles and will dig deeper and deeper into spatial challenges that can be expressed in algebraic terms. You will also be supplied with a master to make copies for your own classes.

D16 HIGHLY ENGAGING PRIMARY TASKS TO BUILD UNDERSTANDING AND PROBLEM **SOLVING**

(Exploring effective pedagogies, Valuing evidence)

Russell McCartney and Brendan Hodge, Victoria Academy of Teaching and Leadership: Teaching Excellence Program 2022 (Year 3 to Year 6)

This hands-on workshop is packed full of tested, quality tasks you can easily use in your classroom the very next day! It



will provide you with new ideas and demonstrate engaging pedagogies while using common classroom materials to build understanding and problem solving skills in primary mathematics.

D17 CHANGING PRACTICE THROUGH THE USE OF NEWMAN'S ERROR ANALYSIS

(Exploring Effective Pedagogies, Improving individual and societal outcomes, Valuing evidence)

Kris Westcott, Sackville Street Public School (F to Year 6)

This presentation highlights one school's journey to improve student results when tackling worded problems through the use of Newman's prompts both to analyse student difficulties and as direct problem solving prompts. Using a workshop model, participants will be guided in the use of Newman's Error Analysis as a tool to reflect on student responses to worded problems. Participants will then workshop 'where to next' for a chosen student work sample and design appropriate activities aligned to the relevant syllabus content stage and concept.

D18 USING VISUAL MODELS AND MISCONCEPTIONS TO DEEPEN UNDERSTANDING IN MIDDLE YEARS MATHEMATICS

(Technology to enhance investigation, Exploring effective pedagogies)

Kathy Lin, Edrolo (Year 7 to Year 8)

In this practical hands-on session, participants will explore how to use visual models and misconceptions to help students learn new concepts, building a deep conceptual understanding (beyond rote learning procedures). By workshopping several examples, participants will explore how visual models and explicitly addressing misconceptions are powerful tools to not only support students but provide formative data to inform differentiated instruction. Whether you're a beginning teacher or looking to refresh your strategies for teaching middle years, this session will give you practical insights and ideas to scaffold and support student learning. Commercial presentation



SESSION D: Thursday, 2.30pm-3.20pm (cont.)

D19 LEADERSHIP AND MATHEMATICS: OPPORTUNITIES FOR OUR LEADERS OF TOMORROW, TODAY

(Achieving greater equity, Improving individual and societal outcomes)

James Dann, Brighton Grammar School (Year 7 to Year 12)

In our current schooling system high achievers are rewarded with university places if they can work individually over a number of years to be able to recall and execute a set of specific processes. This is particularly evident in the VCE Mathematics study design, with schools incentivised to synthesise and directly instruct the required skills for the examinations to maximise their students' scores. By rewarding individualistic learning behaviours throughout secondary school, we run the risk of our best and brightest lacking the development of the 21st century "soft-skills" that will make them successful in their work pursuits, where many of them will likely end up as leaders. This presentation will provide recommendations for low-cost programs and structures that give opportunities for hard-working, high achieving students to lead and collaborate, without compromising on their academic pursuits. It will begin with stories about successful and not-so-successful implementations of student-led mathematical problem-solving groups and mathematical peer-support programs. The main section of the presentation will provide participants with practical strategies for engaging their strongest young mathematics students in these programs and contextualising the structures to fit their purpose. If practical, the presentation will conclude with interested participants given the opportunity to workshop their ideas for implementation at their schools.

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SESSION DETAILS FRIDAY 2 DECEMBER 2022

KEYNOTES: Friday, 9.15am-10.15am

KF01 MOTIVATING STUDENTS IN MATHEMATICS THROUGH CONCEPTUAL PLAYWORLDS AND REALWORLD SITUATIONS

(Improving individual and societal outcomes, Technology to enhance investigation, Exploring effective pedagogies, Valuing evidence)

Marilyn Fleer, Monash University (F to Year 6)

Recently a Year 6 teacher who participated in a curriculum project with the Conceptual PlayLab asked his students if they enjoyed being taught mathematics through the new approach. Every child enthusiastically put up their hand! He said, "If I can engage every child in mathematics, then I am going to teach like this all the time!" In this session we will move from creating engaging moments in mathematics to planning and fostering how to motivate child mathematicians. We will introduce a Conceptual PlayWorlds for Foundation-Year 4 and RealWorld situations for Years 5-6 students, and discuss this model as the basis for motivating and engaging students. Our evidence-based model has come from 20 years of research into imagination in STEM and imagination in play. Through video examples of real-world practices from Laburnum Primary School we will explore the 5 planning characteristics of this model for successfully engaging and motivating students in mathematics.

KF02 FROM PROBLEM SOLVING AND REASONING → UNDERSTANDING AND FLUENCY

(Exploring effective pedagogies)

Jill Brown, Deakin University and Melanie O'Reilly, Findon Primary School (Year 3 to Year 6)

Mathematics can be challenging to teach and to learn. Improving the quality of teaching and learning mathematics occurs when both teachers and students work together. Jill (mathematics education researcher) and Mel (School Mathematics Leader) spent 5 years working together with teachers and students in one Primary School. Our keynote will present and discuss some ideas we used to motivate and engage learners in mathematical activity. We will illustrate approaches to developing the capacity of learners to collaborate and communicate mathematical ideas. Our focus was on all the four proficiencies and development of a productive disposition toward mathematics. We will share tasks and pedagogical approaches to effectively engage students in problem solving and mathematical reasoning which also developed conceptual understanding and procedural fluency.

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KF03 VALUING AND EXPLORING HOW TECHNOLOGY ENHANCES MATHEMATICAL INVESTIGATION AND DISCOVERY

(Technology to enhance investigation)

Thomas Moore, EngageME Mathematics, Rachael Whitney-Smith, Australian Curriculum Assessment and Reporting Authority (ACARA), Peter Fox, Texas Instruments and Allason McNamara, Trinity Grammar School

(Year 7 to Year 12)

The panel will discuss how technology in the classroom may enhance student learning, provide opportunities for mathematical exploration, deep thinking, developing the proficiencies, and enhancing engagement. It may provide opportunities for collaboration, demonstrating algorithmic thinking, modelling, and exploring real world data to contextualise learning. Some technology may also provide analytical data to support monitoring student progression. However, technology can lead to inequality of access, distraction and procedural learning focusing on skill and drill reflecting a lack of reasoning. Some topics require the use of technology e.g. statistical graphing in the middle years. All the VCE mathematical study designs mandate appropriate use of technology. How do you use technology to achieve goals and meet requirement? How can technology enhance mathematical investigation and discovery for students? Join us at this panel keynote to explore and challenge thinking on how we value technology. We will focus on the advantages technology brings when used effectively as a teaching and learning tool and discuss ideas to remove technology roadblocks that may exist, to enhance your own implementation.





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

KF04 PROBLEM SOLVING AND REASONING CAN BUILD MATHEMATICAL UNDERSTANDING AND FLUENCY

(Exploring effective pedagogies)

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

Problem solving and reasoning can be learned. Problem solving and reasoning can foster understanding and fluency rather than being merely the application of those proficiencies. Using examples from the secondary curriculum, the presentation will elaborate how effective pedagogies can engage and equip students to be problem solvers, and critical and creative users of mathematics.

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KF05 MATHEMATICS EDUCATION: CHANGING TIMES, CHANGING PRACTICES

(Technology to enhance investigation, Exploring effective pedagogies, Valuing evidence)

Catherine Attard, Western Sydney University (F to Year 8)

Mathematics education is evolving. The past two years have seen unprecedented interruptions to education due to COVID-19 and interruptions such as these are rare occurrences. As mathematics educators we need to use this moment in time, against the backdrop of significant curriculum renewal, as an opportunity to reflect on what we learned during the disruptions. In response, we need to recalibrate our practices: change what we do and how we do it to enhance the learning and engagement of our students. Then, we need to refocus and move forward with delivering high quality, effective mathematics education that suits the needs of every learner, everywhere, every time. In this keynote I will discuss aspects of mathematics education that are critical for student success such as student engagement, the use of digital resources, and effective assessment and planning in mathematics. Suitable for P-8.

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ONLINE SESSION: Friday, 10.25am-10.55am

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OF 01 USING THE PLACE VALUE ASSESSMENT TOOL (PVAT) TO GUIDE YOUR PLACE VALUE TEACHING IN 2023

(Valuing evidence)

Angela Rogers RMIT University (Year 3 to Year 6)

Are you looking for a free comprehensive assessment to guide your teaching of place value in 2023? The Place Value Assessment Tool (PVAT) is a valid and reliable whole number place value paper and pen assessment for Year 3-6 students. Ange developed this assessment in her PhD research. In this session she will demonstrate how you can use the data your class or school gathers from the PVAT, to structure your planning and teaching of place value both in Term 1 and beyond. Ange will share ideas for moderating the data, and how creating and using a Guttman chart can assist you to analyse potential instructional gaps that may appear in your teaching of place value. You will walk away from this session with a clear understanding of how the PVAT can support your school to develop a whole school focus on place value through the use of the six aspects of place value.

OF02 A SCHOOL WITHOUT BOOKS

(Exploring effective pedagogies)

Doug Williams Mathematics Centre (F to Year 6)

Not possible! A school without books would have an impoverished curriculum. Books are chosen by students for fun and lead to literacy and literary adventures. Books are chosen by teachers for small group and whole class adventures. It's the same with maths tasks. Chosen by students for fun and leading to skill development and reasoning adventures. Chosen by teachers for small group or whole class mathematical adventures. And they are the only problem solving resource that integrates the use of concrete materials. In this workshop you play with sample tasks and learn how to create your own Task Library within an on-going, self-directed professional development programme.

OF03 CREATING MATHEMATICAL INVESTIGATIONS & SACS IN GENERAL MATHS UNITS 1 - 4

(Improving individual and societal outcomes)

Kevin McMenamin Mentone Grammar (Year 11 to Year 12)

The 2023 Study Design sees an increase in weighting allocation (Unit 3 and 4) to School Assessed coursework to 40% of overall assessment as compared to 34% in current study Design and an introduction of Mathematical Investigations to the Unit 1 and 2 level. With the increased emphasis on school assessed coursework it is important teachers are aware of how to write, develop and assess, (according to criterion mapping), appropriate Application and Modelling and Problem Solving Tasks. This session will outline all these aspects.

OF04 PYTHON FOR VCE MATHS TEACHERS

(Technology to enhance investigation)

Robin Wang, Preshil Secondary College (Year 11 to Year 12)

Computational and algorithmic thinking has become an essential component in the new VCE mathematics study design (2023-2027). This tutorial aims to equip VCE maths teachers with fundamental coding skills for them to better integrate computational and algorithmic thinking in their maths class. An elegant computing programming language - Python is chosen due to its easy readability and interactive mode. In this tutorial the basics of Python will be walked through. Two unique but very useful features of Python: list comprehension and functional programming will be explored. In the end, matrices and graphs will be introduced with Python along with three selected algorithms in graph theory.

OF05 VALUING SCIENTIFIC CALCULATORS IN A CHANGING WORLD

(Technology to enhance investigation)

Barry Kissane, retired teacher (Year 6 to Year 10)

Scientific calculators are frequently misunderstood as supporting only numerical calculation, so that many learning opportunities are missed. However the major educational purpose of calculators is to provide students with opportunities to experience mathematics through personal activity, and modern calculators have been designed accordingly. This presentation will demonstrate some examples of this, focusing mostly on the Number and Algebra strand, including fractions, decimals, surds and functions.

OF06 PROBLEM SOLVING: GETTING THEM ALL ABOARD

(Exploring effective pedagogies)

Mark Ljubic and Andrew Greville, St. Joseph's Secondary College Mildura (Year 5 to Year 10)

Reflections from Mark.... I was in Year 7 in 1981. What a great year to start high school. My teacher Mr Greenwell wasn't your everyday sit down and do the left-hand side of the book teacher. Instead he threw down challenges that got us thinking about the process of tackling his at times off-beat questions. His questions, although open-ended, invited responses from all members of my mixed ability class as he sat in the front of the class and teased the answers from us. Today we hope to recreate those great moments as we look at 1981 more closely. Are you ready for the 1981 challenge?

OF07 WHAT IS 'BEST PRACTICE' IN 2022? WHAT IS GREAT TEACHING? WHAT ARE OUTSTANDING PEDAGOGIES?

(Exploring effective pedagogies, Valuing evidence)

Jennifer Bowden and Peter Saffin, The Mathematical Association of Victoria (F to Year 6)

What is 'best practice' in 2022? Let's explore some aspects of great teaching and outstanding pedagogies to kick off our day. We need our students to be able to do mathematics, and value it! They need to understand why it's important, as they require it for success in everyday life. Maths anxiety and disengagement can leave students feeling that maths is disconnected from their lived experience, and that mastery is required to feel success. Traditional approaches can create pass or fail situations (think uor X) that put students under stress and make students feel they can't succeed. Good teachers mix approaches; inquiry-based learning, warm-ups, number talks, discussion and exploring the proficiencies, supported by explicit instruction, prompts, differentiation and other techniques allow teachers to select the best approach for their students at their point of need, and in a typical mixed ability classroom not all students need the same instructional approach at the same time. Let's explore techniques educators can use, and how can you add to your repertoire.



OF08 WORTHWHILE CAS CALCULATOR USE IN THIS YEAR'S MATHEMATICAL METHODS EXAM 2

(Technology to enhance investigation)

Kevin McMenamin Mentone Grammar (Year 9 to Year 12)

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

OF09 INTEGRATING 'MATHTASK' IN MIDSENIOR LEVEL MATHEMATICS CLASSROOM: A POWERFUL PEDAGOGICAL TOOL TO PROMOTE STUDENTS' CONCEPTUAL UNDERSTANDING AND CONNECTION

(Exploring effective pedagogies)

Jiqing Sun Deakin University (Year 10 to Year 12)

In many mid-senior level (i.e. Year 10 - 12) classroom, despite teachers understand underlining concepts and connection amongst these concepts are important, the practical teaching might be heavily 'procedure' orientated due to the pressure brought from tight curriculum timeframe and high-stake exams. In this sense, more pedagogical supports are needed so teachers are able to teach beyond 'procedures' in everyday practice. 'MathTask' provides a range of mathematical problems, and many of them are exam style questions, which can elicit deeper discussion around a particular topic. In this report, I will showcase how some of 'MathTask' problems can be utilised in everyday mid-senior level classrooms. My intention is to show how teachers can use this kind of problems as a pedagogical tool not also to cater for needs of the high-stake exam, but also enhance students' conceptual knowledge and its connection.



ONLINE SESSION: Friday, 10.25am-10.55am

THESE SESSIONS ARE ONLINE ONLY AND WILL RUN DURING MORNING TEA

OF10 ENGINEERING AHA' MOMENTS IN NUMBER

(Exploring effective pedagogies)

Doug Williams Mathematics Centre (F to Year 6)

Calculating Changes has been engineering 'Aha' moments in number for more than 25 years. Evolving from classroom experiences shared through the network, it supports teachers to structure their classroom so 'Aha' moments happen more often. Children's number sense, concepts, skills, confidence and mathematical communication are enhanced and teachers are often surprised. If you teach K-6 this workshop is an opportunity to explore the teaching craft, classrooms, materials and activities around which Calculating Changes has developed. We will also touch on Working Mathematically with Infants, a resource that gathers the network's activities and pedagogy into 60 weeks of planned, sequenced number work through Years K-2. 3. Trig: exploration of the ratios involved with right angled triangles through application tasks prior to connecting with SOHCAHTOA.

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\$42 (MEMBER) \$52.50 (NON MEMBER)

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Make the most of every minute of the day:



5 minutes at the end of the day.

The activities

- are easy to organise and implement
- require minimum equipment, or none at all
- are easily adapted across a range of year and age levels
- can be readily used as part of any maths program
- are perfect for revision or extension.

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THE VERY HUNGRY CATERPILLAR



Eric Carle's children's classic is the story of a very small and very hungry caterpillar who manages to nibble his way through the pages of this enchanting book. Every child should experience this wonderful, cumulative story, with its brightly coloured pictures of the tiny but greedy caterpillar that eats his way through one apple, two plums and three pears before turning into a beautiful butterfly.

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













MOLLY AND THE MATHEMATICAL MYSTERY



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

This brilliantly created book shows maths isn't just about numbers and sums... it's also about using your imagination, making sense of the world, and making seemingly impossible things possible! An explorative and creative approach to the sometimes daunting topic of maths.

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MATHOLOGY LITTLE **BOOKS: BIG BUDDY DAYS**



Mr. Kesting's Year 2 class are excited. They're going to be Big Buddies! What will they do with their little Buddies – and how will they decide?

This pack contains:

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- Big Buddy Days is 24 pages in length and suited for the Year 2 Australian year level. The Teacher's Guide is 40 pages in length.

The Teacher Guides provide scaffolded, hands-on activities with concrete materials, with no need for workbooks or worksheets. There are also downloadable Line Master resources for each book which can be accessed via Pearson Places.

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SESSION E: Friday, 11am-11.50am

E01 PROBLEM SOLVING AND REASONING CAN BUILD MATHEMATICAL UNDERSTANDING AND FLUENCY - PRIMARY

(Exploring effective pedagogies)

Peter Sullivan, Monash University (F to Year 6)

Problem solving and reasoning can be learned. Problem solving and reasoning can foster understanding and fluency rather than being merely the application of those proficiencies. Using examples from the primary curriculum, the presentation will elaborate how effective pedagogies can engage and equip students to be problem solvers, and critical and creative users of mathematics.

E02 WORKING SMARTER, NOT HARDER AS A NUMERACY LEADER

(Exploring effective pedagogies, Valuing Evidence)

Angela Rogers, RMIT University (F to Year 6)

Are you a Numeracy Leader? Do you feel stretched covering everything required of you in your role? Do you find it challenging to strike a balance between modelling in classrooms, supporting teachers in planning, facilitating PLTs, and keeping the maths resource room in order! If this is something you struggle with (and let's face it, who doesn't?!), this session is for you! In this practical presentation, Ange will run through her top 10 tips for working smarter not harder as a Numeracy Leader. Ange will present ideas around intervention, enrichment, yearly planning, unit planning, selecting guality assessments, running PLTs, modelling lessons, selecting resources and developing a community of learners among your staff. You will walk away from this session with simple but effective changes you can make to begin 2023 with a fresh, streamlined approach to leading change in your school

E03 2021 MATHEMATICAL METHODS **EXAMINATIONS**

(Improving individual and societal outcomes, Valuing evidence)

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

Allason and Cathy will do a similar session to the 2022 MAV Meet the Examiners Lecture for Mathematical Methods.



They will discuss common errors that students made on the 2021 examinations. Cathy will talk about Exam 1 and Allason Exam 2. The statistics for each question will also be shown.

E04 2023 FOUNDATION MATHEMATICS UNITS1-4: AN OVERVIEW AND INFORMATION SESSION

(Improving individual and societal outcomes)

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

The new Study Design has expanded the initial offering of Foundation Mathematics to now include Units 3 and 4. This session will provide an overview of the study, present general information on a suitable course and work through some possible Mathematical Investigations. This session would be suitable for those new to teaching this study of Mathematics.

E05 HOW TO BUILD MATHEMATICAL THINKING WITH GAMES

(Exploring effective pedagogies)

Michaela Epstein, Maths Teacher Circles (Year 3 to Year 10)

Too often, maths is considered dry and confusing. But, yet it can offer so much more than these stereotypes suggest. In this session, you'll look at a side of maths that is fascinating, fun and gives learners of all ages experiences that leave them hungry for more. With a focus on mathematical games, you'll explore how to not only support students to view maths differently, but to also help them become stronger mathematical thinkers.

E06 PATTERNS IN ART AS MATHEMATICS ENRICHMENT

(Exploring effective pedagogies)

Jennifer Palisse, Monash Tech School (Year 5 to Year 8)

Looking for in-depth investigation projects for students who love to draw? In this session, we will show case some activities we have used as part of our Supersigma program. an enrichment program that forms part of the Victorian Challenge and Enrichment Series. In this workshop, we will explore patterns within spirographs, string art, and spiralling squares. Each task involves an engagement artistic component as well as an open-ended investigation drawing from mathematics beyond the curriculum. Mathematical skills required involve fractions and modular arithmetic. Tasks are highly differentiable and suitable for upper primary to middle secondary students.

E07 VISUALISING DECIMAL PLACE VALUE TO BUILD UNDERSTANDING

(Achieving greater equity, Exploring effective pedagogies, Valuing evidence)

Antje Leigh-Lancaster, Leigh-Lancaster Consulting (Year 3 to Year 8)

One of the challenges when developing understanding of **E10 MATHS IN SCHOOLS: NATIONAL** decimal place value is to represent the size of the smaller **TEACHING AND LEARNING RESOURCES TO** place values in correct proportion. In this hands-on session SUPPORT MATHEMATICS AND NUMERACY you will have the opportunity to engage with a fresh approach to introducing decimals (10ths, 100ths and 1000ths) using (Exploring effective pedagogies) a combination of printed numberlines, number talks and a specially developed numberline template in Excel. One of Debbie Reinholtd, The University of Adelaide, Genovieve the benefits of using a spreadsheet is the visual representation Grouios. CSER STEM Team-Maths in Schools and John of decimal place value and the relationships between West, Mathematical Association of Western Australia them. This also leads nicely into equivalence and rounding. (MAWA) Handouts and the Excel template will be shared with (F to Year 10) participants. Participants are encouraged to bring a laptop.

E08 FUN WITH DRAWINGS USING TI-NSPIRE. FOOTY JUMPERS SHAPES AND COLOURS

(Technology to enhance investigation)

Raymond Rozen, RMIT and Shane Dempsey, Hamilton College (Year 11 to Year 12)

The latest version of TI-Nspire has intrinsic functions to draw and fill shapes. In this hands- on session we will use TI-Nspire to write programs to draw and colour some of the AFL footy teams jumpers. Come along to this colourful activity and use coordinate geometry and learn STEM concepts and programming skills. Please bring along a TI-Nspire CX II CAS calculator, or your laptop with TI-Nspire.

E09 MATHEMATICAL INVESTIGATIONS - IDEAS FOR THE NEW VCE UNIT 1 & 2 **COURSES**

(Exploring effective pedagogies, Technology to enhance investigation)

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

Looking for some free, ready to use Mathematical Investigations for 2023? Teachers in this session will be provided with a selection of Mathematical Investigations and choose which ones they would like to immediately explore. Sample contexts include: Fibonacci Sequence (including

pseudo code opportunities), modelling and qualitative analysis of rates of change from real data, modelling superannuation and simulations to investigate the sample mean distribution of an experiment. Content will also be available in Word format so teachers can edit to suit individual needs and technology platforms. Examples focus mainly on Unit 1 & 2 VCE Mathematics courses - General + Methods + Specialist

The Maths in Schools project is a collaborative national project funded by the Australian Government Department of Education, Skills and Employment (DESE) and delivered in partnership with Education Services Australia (ESA) and the University of Adelaide (UoA). The Maths in Schools project provides free support for mathematics and numeracy teachers of Foundation to Year 10 students through online courses, face-to-face and/or virtual professional learning and provision of a repository of teaching and learning resources through an online Mathematics Hub (Maths Hub) and Numeracy Check. This presentation will introduce you to a suite of professional learning in mathematics and provide an overview of the integrated key components of the project being delivered by the University of Adelaide's CSER STEM Team. Learn about our three free online courses for teachers in Foundation - Year 2, Year 3 - Year 6 and Year 7 10 in addition to our suite of webinars and downloadable resources. The resources are designed to be flexible, self-paced and enable contextualisation to suit your local school needs and learning priorities. This presentation is particularly targeted at school and curriculum leaders as well as interested individual teachers including preservice and teachers who are out of field.



SESSION E: Friday, 11am-11.50am (cont.)

E11 QUESTIONING AND DIALOGUE IN EARLY YEARS CLASSROOMS

(Achieving greater equity, Exploring effective pedagogies)

Carolyn McCabe and Christina Tropea, Department of Education and Training (F to Year 2)

As educators, it is important to explore questioning skills and techniques to bring mathematics dialogue to life in our classrooms. This session will have a hands-on workshop approach to explore skills and techniques for enhancing dialogue in your classroom/context. The mathematics focus of this session will be number and measurement contexts. All resources used in this session are available (free) to all schools and contexts.

E12 THE MAGIC OF LEARNING MATHS SOCIALLY

(Improving individual and societal outcomes, Exploring effective pedagogies)

Andrew Lorimer-Derham, Think Square (Year 3 to Year 8)

Teaching is a human experience. We didn't enter this profession to deliver content to faceless black squares, we did it to connect with young people and help them thrive. Sadly, many students are not thriving back in the physical classroom. Those used to clicking 'mute' and opting out are anxious and find it hard to contribute in class, others find it impossible to focus with less work or consider those around them. Now more than ever, students need humanising in-person experiences where they are encouraged to share ideas, work together, resolve conflict and value one another. This workshop will deliver a range of mathematically rich, communal experiences we so desperately need to recover the personal and social capacity that has been lost. Come and experience the magic of gathering in person.

E13 POINTS, LINES, PLANES AND SURFACES IN R3

(Exploring effective pedagogies)

Brian Stokes, Monash University (Year 11 to Year 12)

The parametric equation of a line will be introduced. The equation of a plane will be discussed and illustrated. The distance between two parallel planes will be determined using a simplified formula and then using a more detailed method. The distance between two lines in space will be calculated and the distance of a line from a point will be discussed. The line of intersection of two planes will be derived and the angle between two planes will be calculated for a specific case. Surface areas and volumes will be determined for second degree surfaces using calculus. This session will be focussed on a geometrical consideration of points, lines, planes and surfaces in R3.

E14 COMPUTATIONAL THINKING IN PROBLEM-SOLVING, AND ITS APPLICATION TO MATHEMATICAL INVESTIGATION

(Technology to enhance investigation, Exploring effective pedagogies)

Brian Lannen, Murray Mathematics Curriculum Services (Year 9 to Year 12)

How much do you think about thinking? Algorithmic processes are a natural part of mathematics and, although we can assign some of this to technology, humans need to also play an active and creative role in the partnership. No wonder there is such a focus on this in the newly revised VCE Study Design. In this workshop we explore the notion of what this thinking is all about and examine the principles of setting up simulations and processes to model and investigate problems. The discussion will be illuminated with examples suited to problem solving and investigations from Years 9 to 12.

E15 FROM THE GROUND UP: HOW TO START A NUMERACY NETWORK

(Achieving greater equity, Improving individual and societal outcomes, Valuing evidence)

Bernadette Pearce, Catholic Education Sandhurst Ltd, Sue Kerlin, St Josephs Primary School, Georgia Sofra, Notre Dame College, Lauren Gould, St Mary's Echuca and Andrea Skahill, Marian College (F to Year 10)

What can be gained from investing time and energy in forming and participating in a Numeracy Network? Learn from the leaders and teachers who created a Numeracy Network from the ground. Gain an understanding of how the Numeracy Network provided opportunities for leaders, teachers and academics to connect, explore and learn from and with one another. This session highlights how school Numeracy Leaders from Catholic Education Sandhurst Ltd created a movement across the Diocese to feel more connected and gain knowledge.

E18 WHAT IS PSEUDOCODE(A NEW LEARNING IN VCE MATHEMATICS STUDY DESIGN)? TOOLS AND KNOWLEDGE REQUIRED.

(Exploring effective pedagogies, Technology to enhance investigation)

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

Pseudocoding is a new inclusion in the VCE Mathematics study design. This session will be an introduction to Pseudocoding. The TI Nspire CX-II calculators now have a provision to code in Python, TI Basic and Lua. This session will demonstrate the use of Python programming/coding language on TI Nspire to understand Pseudocoding. Python is one of the easiest languages to code in. In this Introductory session we will Investigate and write mathematical programs and simulations to understand the mathematics better and do cross-curriculum learning as part of STEM. It will enhance computational and algorithmic thinking.



E19 COMPARISON OF CAS TECHNOLOGIES IN VCE MATHEMATICAL METHODS EXAMINATIONS

(Technology to enhance investigation)

Neale Woods, Retired (Year 11 to Year 12)

In this workshop, Neale Woods will present a series of VCE Mathematical Methods Examination 2 questions comparing solutions obtained using TI-Nspire CAS and Casio ClassPad. As time is vital in these examinations, the emphasis will be on those questions where students using one technology have a time advantage over students using the other technology. The session will be a presentation but participants will be encouraged to discuss and provide alternative solutions.

E20 GOOD QUESTIONS AND GOOD QUESTIONING: TASKS IN THE MATHEMATICS CLASSROOM

(Exploring effective pedagogies, Valuing Evidence)

Carmel Mesiti, University of Melbourne (Year 3 to Year 10)

Whole class discussion and discussion among students are two important elements of constructivist-led teaching. These discussions are organised in such a way so that pupils may discover something new, formulate a hypothesis or confer about different solutions to an assigned task. The main characteristic of 'good' questions is the opportunity for answers at different levels of sophistication (Sullivan & Clarke, 1988). This session will introduce participants to features of good questions and good questioning. Participants will be given sample tasks and sample student responses for reflection and discussion. Characteristics of good questioning for orchestrating class discussion will be identified.



SESSION F: Friday, 12pm-12.50pm

F01 CHECKING FOR UNDERSTANDING: ACHIEVING GREATER EQUITY IN THE MATHEMATICS CLASSROOM

(Achieving greater equity, Exploring effective pedagogies, Valuing evidence)

Cassandra Lowry, St Francis of Assisi Tarneit (F to Year 6)

Classrooms are busy places and too often, as teachers, we hurry though a lesson by seeking responses from a handful of more capable students. This process can have a negative effect on achievement as students will wait for others to respond, be reluctant to share their own approaches and may begin to form ill-conceived beliefs around the importance of speed and assertiveness. This workshop will look to build on the ideas of Rosenshine's Principles of Instruction by suggesting practical ways that teachers can check for student understanding using more inclusive strategies. It will demonstrate how these strategies can be used to increase active participation within the classroom and at the same time promote greater equity across the learning community.

F02 WHAT IS THE PURPOSE OF THIS LESSON? EFFECTIVELY HARNESSING LEARNING INTENTIONS AND SUCCESS CRITERIA

(Exploring effective pedagogies)

Niyati Robson and Jayde Cairns, Regency Primary School (F to Year 6)

This presentation is about the effective use of learning intentions and success criteria in planning and delivering mathematics lessons, and using them as a driving force to convey the purpose of the lesson. Very often the learning intention and success criteria are written based on curriculum outcomes, and teachers are so focussed on those that the purpose of the lesson is lost. This presentation looks at real world mathematics lessons within an inquiry based instructional model, and how these lessons can be easily adapted to make them more purposeful for teachers and allow a greater sense of learning ownership for students. By empowering the students to become owners of their learning there is a natural progression across the proficiencies; particularly looking across the problem solving and reasoning proficiencies; encouraging critical, creative, and reflective learning. The lessons have been taught by teachers in Victorian schools, and the reflections and changes made cover learning outcomes as well as formative assessment opportunities throughout, linking to the High Impact

Teaching Strategies. The ideas in this presentation draw on the use of verbs as proficiencies as referenced by Matt Sexton and Peter Sullivan, and the strategies for co-construction of learning intentions and success criteria as a learning assessment tool by Glen Pearsall.

F03 FRACTIONS, DECIMALS AND PERCENTAGES @ YEAR 7

(Exploring effective pedagogies)

Anthony Harradine, Potts Baker Institute, Prince Alfred College

(Year 7 to Year 8)

What might the teaching of fractions, decimals and percentages, for both understanding and fluency, look like? What are the critical aspects that should be understand? What level of understanding should be expected? How might we accommodate a variety of levels of prior knowledge, and confidence, in the one classroom? These questions, and others, fuelled 18 months of effort to develop a set of materials that support the teaching and learning of fractions, decimals and percentages @ Year 7. The materials include printable and online components and have been tested with real Year 7 students. In this session I will provide answers to the questions above and introduce the materials to you.

F04 EFFECTIVE USE OF CAS TECHNOLOGY IN 2022 SPECIALIST MATHEMATICS EXAM

(Technology to enhance investigation)

Peideng (Martin) Nie, Austin Education Pty Ltd (Year 11 to Year 12)

This presentation is intended to share effective use of CAS calculators in 2022 Specialist Mathematics Exam 2.The presenter will demonstrate both TI Nspire and Casio CP400. For certain questions, the presenter would possibly demonstrate Mathematica uses. All attendees will receive a copy of presentation material including detailed CAS use for each question and relevant analysis.Similar documents prepared by the presenter for Specialist Mathematics Written Exam 2 (2019NHT, 2020, 2021 and other years) will also be shared with attendees, and these documents can be viewed through via: <u>https://drive.google.com/file/d/10CpvJ</u> <u>KinHBOwplKoR4u9X3ooxRB8OM4M/view?usp=sharing</u>

F05 UNPACKING THE MATHEMATICAL PROCESSES IN THE NEW AUSTRALIAN CURRICULUM: MATHEMATICS (SECONDARY)

(Technology to enhance investigation, Exploring effective pedagogies)

Rachael Whitney-Smith, Australian Curriculum Assessment and Reporting Authority (ACARA) (Year 7 to Year 10)

This presentation is aimed at unpacking the mathematical processes in the new Australian Curriculum: Mathematics version 9.0 for Secondary Mathematics teachers. Mathematical modelling, Computational thinking, Statistical investigation and Probability experiments and simulations are not new to mathematics, but are now explicitly included as essential learning in content descriptions and achievement standards in the revised Australian Curriculum: Mathematics. Workshop participants will be provided some background to support their inclusion, examples of how the processes can be developed in practice, links to existing resources, alignment to senior secondary courses and an opportunity for discussion about the impact these have on curriculum planning, classroom pedagogy and assessment.

F06 SIX OF THE BEST- OUR ALL-TIME FAVOURITE MATHS LESSONS

(Exploring effective pedagogies)

Michael Minas, Love Maths and Rob Vingethoets, Consultant (F to Year 6)

Presenting together at a conference for the first time in four years, Mike and Rob bring the energy from their highly successful series of webinars to a live audience. During this hands-on and engaging workshop, they explore their favourite maths lessons of all-time. Attendees will leave the session with a collection of tasks that they can implement back at their own schools straight away. They will also gain an understanding of the pedagogy behind each of these lessons and how this information can be used more broadly to enhance maths teaching and learning at their school.



F07 HIGH YIELD DAILY ROUTINES THAT BUILD MATHEMATICAL UNDERSTANDING AND DISCUSSION

(Exploring effective pedagogies)

Elizabeth Irwin, Independent Education Consultant (F to Year 4)

Daily mathematical routines are low preparation and high yield short activities focused on building strong number sense, student engagement, curiosity and classroom discourse. These routines develop critical and creative thinking, reasoning and problem solving with students sharing strategies that make sense to their learning and their peers. This early years focused workshop will immerse participants in various hands-on routines that can be quickly and easily implemented. They are all aligned to the Maths proficiencies and processes of the Australian Curriculum and build rigorous student discussion in the classroom.

F08 CONCEPT-BASED LEARNING IN MIDDLE YEARS MATHEMATICS

(Exploring effective pedagogies)

Guanghua Wu, Oakleigh Grammar (Year 9 to Year 10)

"Mathematics is a concept domain. It is not, as many people think, a list of facts and methods to be remembered." This presentation is based on the presenter's Practitioner Inquiry of the Teaching Excellence Program (TEP) organised by the Victorian Academy of Teaching and Leadership. When students embark on their mathematics learning at their secondary level, particularly in more senior years (Year 9 and above), many of them tend to perceive maths as a subject predominantly based on procedures. They think that as long as they are fluent in the methods, procedures, or formulae of a topic, they would master the topic. Part of the reason for such perception is how teachers approach secondary maths and how popular textbooks are structured. The problem with this procedure-orientated approach is both teachers and students often ignore the conceptual understanding of the topic. Concepts help organise vast amounts of information into manageable units and make sense of new information. Enduring understandings are concepts that are timeless, universal, and abstract. Mathematics teachers must aim at conceptual understanding rather than mere procedural fluency. The inquiry started with a concept-based approach for a Year 9 Linear Relations unit and expanded to other topics of other year levels. By driving teaching and learning



SESSION F: Friday, 12pm-12.50pm (cont.)

with "big ideas" or concepts, teachers are able to help students make connections between discrete facts to build up their schema of knowledge, It also helps teachers decide on the scope and sequence in a way that they teach for deep-understanding rather than trying to "get through the curriculum". The presentation will share the experience, evidence, and practices in this practitioner inquiry.

F09 GEO-PRO, POLYHEDRA AND 20 FREE WORKSHEETS BOOKS

(Achieving greater equity)

Geoff Phillips, Geoff Phillips Publications (Year 7 to Year 12)

Author and former secondary teacher Geoff Phillips will take participants on a tour of his latest mathematics template, Geo-Pro, and demonstrate its protractor, map scale, giant polyhedra shapes, 5 mm to 380 mm diameter circle maker and much more. Each participant will receive a free Geo-Pro with 72 page lessons/instructional booklet and free access to 20 free pdf books containing thousands of free worksheets, activities, posters and other resources for dozens of topics across years 7-12 Mathematics. Commercial presentation

F10 INSPIRATIONS FOR USING MATHEMATICS AND CODING IN CLASS ACTIVITIES TO CREATE ARTWORKS

(Technology to enhance investigation)

Georgia Gouros, Virtual School Victoria (Year 5 to Year 12)

Student activities to encourage conversations, deeper understanding and application of

- 2D Geometry
- Scaling and ratios
- Recursion and fractals

Some ideas will be presented to develop, enhance and consolidate student understanding with artistic project inspirations including: Impossible objects, cardioids, tessellations and L-System recursion.

Mathematics explored, explained and applied by students in activities using technology with coding examples in Scratch, Snap! and Python.



F11 WHY ARE WE EXPLORING DIFFERENTIATION?

(Achieving greater equity, Exploring effective pedagogies)

Carmel Delahunty, Yeshivah-Beth Rivkah Primary Schools and Judy Gregg, Consultant (F to Year 6)

Including and engaging all students in your maths lesson can be a challenge, as we want all students to enter the 'learning pit', be supported in their productive struggle, and succeed. We need to provide opportunities for students to apply sustained thinking, decision-making and risk-taking. How can all this be achieved in a classroom with a wide range of interests and abilities? This workshop will explore ideas about how to adjust challenging tasks to meet the learning needs of all students. You will practice writing enabling and extending prompts which will assist all students to access the tasks, and thereby experience success.

F12 MATHEMATICS, SCIENCE, AND CODING COME TOGETHER: STEM-ORIENTED CODING IN SCRATCH AND PYTHON

(Technology to enhance investigation)

Sebastian Sardina, RMIT University and University of Melbourne and Max Stephens, University of Melbourne (Year 5 to Year 8)

This is planned as a face-to-face workshop for teachers in the upper primary and junior secondary years. There will also be online access for those who cannot attend in person. The session will demonstrate how technology can support and promote mathematical and science investigation and discovery. To do so, participants will design, share, and trial coding activities in Scratch and Python that are suitable for mathematics and/or STEM classes in Years 5 to 9. Concretely, the session will explore the use of math to support physics modeling which involve reasoning about concepts such as location, gravity, velocity and acceleration, friction, and collision. These activities will be suitable for those wanting to introduce Computational Thinking and Coding for the first time to enrich and support mathematics learning. For those who are a little more experienced, we will set up a website before the conference where you can post something related to the session that has worked successfully for your students; or something you would like to improve. These can be shared before the session and will be integrated into it, as far as possible. As you can see, it's about sharing and learning together. The website will remain active.

F13 STOP! STOP! THE LESSON'S ALREADY DEAD!

(Exploring effective pedagogies)

David Innes, Consultant (Year 5 to Year 12)

The hardest lesson for David Innes, notorious lover of his own voice, to learn was to shut up. Students should do more, teachers talk less. In this session, David will be exploring effective pedagogies that encourage and motivate students to participate. Mathematics teaching is far more effective when we communicate efficiently, effectively and precisely. David will be sharing activities and philosophies that can help students get a better sense of achievement in class.

F14 POSTER PROBLEM CLINIC

(Exploring effective pedagogies)

Doug Williams, Mathematics Centre (Year 3 to Year 10)

The starting point for a mathematician's work is an interesting problem; a question as yet unanswered, but with something about it that encourages exploration. It doesn't matter what the problem is. It does matter that it is interesting. A Poster Problem Clinic is a technique for securing student interest in a word problem to help them learn to work like a mathematician. Adaptable to all levels it is built around Polya's 4 stages. The workshop will be a Clinic and will resource you to run a similar session to introduce your staff to this teaching craft tool.

F15 NUMERO - ENGAGE & HAVE FUN WITH MATHS

(Improving individual and societal outcomes, Exploring effective pedagogies)

Julie Richards, Independent Education & Training Pty Ltd (F to Year 10)

Join this fun, hands-on workshop to see what Numero can do for your students! Learn to play the game as well as teach it. You will be introduced to all aspects of the game to ensure you leave this session with the tools to introduce Numero to your classroom. You will see how Numero can engage with the disengaged, and connect with those who are already lovers of maths. Numero provides a fun, almost contagious, way to focus on fluency, problem solving and reasoning. It is ideal for introducing and reinforcing both simple and complex maths concepts, with easy differentiation for your varying abilities, along with pair, team and solo activities. Julie is the Numero specialist and her passion for this game is contagious!

F16 GOING BEYOND 'SHARE TIME'

(Exploring effective pedagogies)

Ellen Corovic, Corovic Consulting and Jane Hubbard, Melbourne Archdiocese Catholic Schools (MACS) (F to Year 6)

The summary phase is an often overlooked part of the lesson with teachers frequently running out of time, or inspiration. In this session, Jane and Ellen will explore the importance of utilising the summary of the lesson to pull learning together in preparation for the following lesson. Several teaching strategies will be shared to help teachers' planning to go beyond the traditional 'share time'. This will be a handson session where Jane and Ellen will share tasks, teaching strategies, and their knowledge as experienced mathematics consultants.

F17 UNLOCK STUDENT ENGAGEMENT THROUGH SCAFFOLDED MATHEMATICAL REASONING

(Improving individual and societal outcomes, Exploring effective pedagogies)

Joel Townsend, Firefly Education (Year 7 to Year 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 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 implement a scaffolded 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.



SESSION F: Friday, 12pm-12.50pm (cont.)

F18 EXPLORING COMPUTATIONAL **THINKING IN MATHEMATICS 7 - 10**

(Technology to enhance investigation, Exploring effective pedagogies)

David Leigh-Lancaster, Leigh Lancaster Consulting (Year 7 to Year 10)

Computational thinking is a problem-solving methodology that has deep connections to mathematics. In this session, participants will develop their understanding of aspects of computational thinking, discuss how they are related to the 7 - 10 mathematics curriculum and work through a range of illustrative examples. A summary of key ideas and links to related resources will also be provided.

F19 IS IT MERELY A 'DRILL'? A LESSON LEARNT FROM CHINESE MATHEMATICS **'DRILL PRACTICE'**

(Exploring effective pedagogies)

Jiqing Sun, Deakin University (Year 7 to Year 10)

Mathematics education in China is always perceived as 'drill practice' focused, which means students usually do an extensive amount of practice to master the content learned. In this sense, sometimes it is criticized as heavily 'procedural' orientated teaching and learning. However, when closely looking at these so-called 'drill-based' questions, it could be noticed many of them are well crafted to address students' conceptual understanding, flexible thinking, and reasoning. For instance, in algebra, many questions expose students to the structure flexibilities that are critical for mathematics learning at the senior level. Another example is that judging whether a statement or a procedure is correct or not is a very popular type of practice, which is supportive to the development of students' conceptual understanding. In this presentation, the presenter will show a range of examples of questions in the Chinese mathematics exercise book and discuss the rich pedagogical opportunities behind them, which might be directly applied to Australian secondary mathematics classrooms.

F20 RICH LEARNING TASKS WITH FIRST NATIONS COMMUNITY LINKS

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies)

Andrew Mark, Maths Pathway/ATSIMA (Year 3 to Year 10)

This presentation is an introduction to some Rich Learning tasks that have been developed in a partnership between ATSIMA and Maths Pathway. The tasks have an introductory video that provides context to First Nations communities and are designed to be conducted over two lessons with a low floor and high ceiling structure for students.

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SESSION G: Friday, 1.30pm-2.20pm

G01 INDUCTIVE REASONING

(Improving individual and societal outcomes, Valuing evidence)

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

Mathematicians are used to encountering problems that are simply stated, yet unsolved. This presentation deals with one such problem in philosophy - the problem of induction. Statisticians employ inductive reasoning when drawing an inference about a population from sample data. Inductive reasoning is used routinely in interpreting the results of applications of statistics in society, scientific research, and everyday life, even shopping. However, there is a longstanding problem with inductive reasoning that philosophers call the problem of induction. When teaching students about probability and statistics, it behaves us to be aware of this problem. The purpose of this expository presentation is to describe the problem of induction and its history. An understanding of induction will enhance the critical abilities of our students to value the role of probability and statistics in today's society. Note that the philosophical problem of induction is different from, but connected to, the principle of mathematical induction; this connection will also be explored in the paper.

G02 FALLING BACK IN LOVE WITH MATHS

(Exploring effective pedagogies, Improving individual and societal outcomes)

Bernard Kerrins, St Francis of The Fields Primary School (F to Year 8)

For so long we have heard the cliche "I'm no good at maths". An attitude of defeatism often accompanies this. From parents, teachers and students. This workshop addresses this.Why is it seen as acceptable to publicly downgrade our own maths ability rather than strive to be proactive about it? Rediscover your own passion to learn and teach maths and pass on this enthusiasm to your students. Watch your lessons come alive, to the point where you and your students will eagerly anticipate your lessons rather than waiting to rush out of them. This workshop will present and demonstrate proven strategies that engage students and teachers, encourage them to be enthusiastic problem solvers while at the same time improving their capabilities across the maths curriculum. Developing a mindset that is directed towards becoming more involved in maths will be a focus. Practical ideas and methods will be demonstrated and explained in ways that will

help all participants to value maths more and develop greater self belief in their own ability to learn and teach maths.

GO3 GENERATING EQUATIONS AND DATA FROM IMAGES PRODUCED BY STUDENTS

(Technology to enhance investigation)

Stephen Broderick, St Ursula's College, Toowoomba (Year 7 to Year 12)

Images produced by students tracing out various curves will be analysed with TI-Nspire software to determine the nature of these curves which will include ellipses, parabolas and linear equations. This process is then extended to determine the eccentricity of the Earth's orbit around the Sun. Images of the Great Red Spot (GRS) will be used to develop a model for its disappearance this century. Further activities include determining the distance to the International Space Station (ISS) as it transits the Moon and determining the heights of mountains and the depths of craters on the Moon from shadows. The relationship between brightness, altitude and distance to the ISS will also be investigated.

G04 EXPLORING TEACHING & LEARNING OF MATHEMATICAL REASONING

(Achieving greater equity, Exploring effective pedagogies, Valuing evidence)

Hannah Young and Dilys Potter, Collingwood College (Year 7 to Year 10)

Collingwood College is a culturally diverse school with a broad spectrum of students; from those with significant gaps in their schooling to those with exceptional maths skills, both EAL learners and native English speakers. During this presentation, we will share how we create and teach a unit that is inclusive of all students and provides all learners an opportunity to deepen their skills in mathematical reasoning creating. We have focused on reasoning as a way of supporting our learners to be able to use their mathematical skills in a changing world. We will share how we have incorporated resources from the Reframing Mathematical Futures II project to evaluate our teaching practice and differentiate our curriculum using a learning continuum.

G05 REPLACING TRADITIONAL TEXTBOOKS WITH INNOVATIVE TECHNOLOGY

(Technology to enhance investigation, Valuing evidence)

Daniel O'Kane, Mathspace and Vaughan Nikitin, Fitzroy High School (Year 3 to Year 12)

Vaughan Nikitin is the Head of Mathematics at Fitzroy High School. Instead of using traditional textbooks, Vaughan and his team use Mathspace for both teaching & assessment of mathematics skills and concepts, particularly those involving two of the four proficiencies Fluency and Understanding.

Using a data-driven approach, the school is able to quickly identify learning gaps amongst their students, provide targeted intervention and instill growth mindsets, so that all students can experience success in mathematics across all four proficiencies including Problem Solving and Reasoning, regardless of their identified grade level.

Describing himself as an "open-source kind of guy", Vaughan will share his school's approach to mathematics instruction. This is the perfect opportunity to learn from an experienced digital educator.

GO6 PICTURE BOOKS - A SPRINGBOARD FOR EFFECTIVE MATHS TEACHING

(Achieving greater equity, Improving individual and societal outcomes, Exploring effective pedagogies, Valuing evidence)

Jennifer Bowden, Mathematical Association of Victoria and Sheila Griffin, Association of Independent Schools Western Australia

(F to Year 4)

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



G07 BAD GRAPHS, GREAT EXAMPLES

(Exploring effective pedagogies)

Kate Copping, University of Melbourne (Year 3 to Year 8)

This workshop examines the use of a variety of statistical representations to promote critical thinking and statistical literacy. Analysing data sources and interpreting graphical representations is a necessary component of being numerate. Many students can form graphs, but have difficulty interpreting them. Poor examples of graphs in the media influence how people interpret important information regarding current issues such as the environment, health, and finance. The use of poor or incorrect examples of graphs and other forms of data representation, can help students to identify bias. Non-examples also assist in the identification of important considerations for construction of student's own data representations. This workshop will examine samples and how they could be used in the classroom. Commercial Presentation

G08 FOUNDATION MATHEMATICS: HANDS ON EXPERIENCES

(Achieving greater equity)

Marilyn Hand, Educator (Year 11 to Year 12)

How often do we hear adults say, I can't do Maths? The obvious effect of this lack of self-belief is that they feel that they can't assist their Secondary school children with Maths homework. The subtle, insidious effect is that the children believe that the same will be true for them. Mathematics should not be for tests and exams. If we are creative, the mathematics skills and knowledge that we teach can metaphorically be put into the students' back pockets and taken out into their real worlds. The workshop Foundation Maths: Out and About, will provide participants with handson experience of how to apply the learning in Foundation Mathematics in engaging and inspiring activities that will excite and empower their students.



SESSION G: Friday, 1.30pm-2.20pm (cont.)

G09 WHO CARES ABOUT SCIENTIFIC CALCULATORS?

(Exploring effective pedagogies, Technology to enhance investigation)

Alastair Lupton, Adelaide Botanic High School (Year 7 to Year 10)

Once upon a time, scientific calculators were a big deal, back in the day ... but, with the explosion of other electronic technology in the mathematics classrooms, including graphing and CAS calculators, alongside laptops and tablets accessing powerful online apps, are they still relevant? Does it matter what calculative tool(s) our students in the middle years get their hands on? Does it matter how number is represented? How algebra is first interacted with? Statistical calculations performed? Should this use be planned, and what happens if it is not? These questions will be discussed and stock will be taken of the technology options in the middle schools of 2022.

G10 CREATING SUCCESSFUL PROBLEM SOLVING LESSONS

(Exploring effective pedagogies)

Jill Cheeseman, Monash University (F to Year 4)

In this workshop participants will share successful ideas for mathematical problem solving in the primary school. Lesson plans that use manipulatives, literature as a stimulus for problem posing, everyday objects, and games, will be examined by participants. We will describe and discuss features of successful lessons with younger students and productive approaches to problem solving. Everyone is encouraged to bring along examples of lessons that work for them.

G11 STRONGER SOCIAL CITIZENS THROUGH FINANCIAL LITERACY: CREATING LASTING **IMPACT**

(Achieving greater equity, Improving individual and societal outcomes, Technology to enhance investigation)

James Forscutt, Banger (Year 5 to Year 10)

Financial literacy is built upon a strong foundation of core mathematic concepts. This foundation allows all people to make sound decisions throughout their lives, building wealth to positively impact one's future. Explore why financial



education is essential for our young people, and learn about how to bring this alive in the classroom with tools resources and case studies. Discover how educators have delivered lessons that spark student curiosity and create real social impact with Banger, Australasia's financial education experts. Commercial presentation

G12 ENABLING LEARNERS TO DISTINGUISH BETWEEN MEASUREMENT ATTRIBUTES. **USING VARIATION THEORY**

(Exploring effective pedagogies)

Heather McMaster, University of Sydney (Year 3 to Year 8)

One method of designing quality tasks, is to design them according to Variation Theory (VT). The underlying principle of VT is that by keeping one aspect (or attribute) constant, the learners' attention is drawn to the aspect (or attribute) that varies. In this workshop you will be introduced to VT and given examples of simple tasks in which the underlying principle of VT is used to help students distinguish between measurement attributes eq. the perimeter of a rectangle and its area, the volume of a material and its mass.

Heather would like to acknowledge the Sydney University STEM Teacher Enrichment Academy, www.sydney.edu.au/ engage/schools/stem-teacher-enrichment-academy.html)

G13 CREATING A CULTURE OF STAFF COLLABORATION

(Exploring effective pedagogies, Valuing evidence)

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

Collaboration is an essential skill we need in life and is fundamental for success in many situations. It is a disposition held in high regard for our students and the qualities of a collaborator have an important place in the learning and teaching within many classrooms. However, is the same priority also held for the staff in our schools? Do schools need to also ensure that collaborative structures are in place for staff and allow opportunities for them to develop the disposition of a collaborator? It is through collaboration amongst staff where schools can lead to better student outcomes as well as improving pedagogical knowledge and content knowledge (Fisher, Frey, Almarode, Flories & Nagel, 2019). Although, how is this achieved? One cannot simply provide teachers with resources, put them in a room together and hope that they will increase their capacity to teach and therefore have a greater impact on student learning. Schools need to provide staff with the tools, strategies, support and feedback in developing their collaborative skills.

G14 SUPPORTING STUDENTS TO COMMUNICATE SOLUTIONS WHEN WORKING WITH TECHNOLOGY

(Technology to enhance investigation, Exploring effective pedagogies)

Scott Cameron and Lynda Ball, The University of Melbourne (Year 9 to Year 10)

The sustained use of challenging mathematics tasks, implemented through an inquiry pedagogy, support students in developing their conceptual understanding Students' beliefs about the need to show pen-and-paper working out can influence their choices about when and how and reasoning skills. Challenging tasks equip students to become problem solvers, and critical and creative users of they use technology. In this session, participants will explore strategies for supporting students to record appropriate mathematics. The open ended nature of challenging tasks leads to student responses that demonstrate various stages solutions when working with technology. Participants will consider their own beliefs about pen-and-paper working out progress and success. However, interpreting these responses for assessment purposes pose many challenges for teachers. when solving problems with technology, and how these beliefs might impact their teaching. Participants will explore a range This workshop explores assessment practices that enable of problems and discuss the features of good written solutions efficient and reliable monitoring of student responses to challenging mathematics tasks. The session aims to provide when working with technology. participants with some practical and effective assessment processes that align with challenging tasks pedagogies. We will present how marking- keys can be effectively used to monitor student progress and identify future learning goals.

G16 TEACHING GEOMETRY FOR UNDERSTANDING USING THE MATHOMAT

(Achieving greater equity, Technology to enhance investigation, Exploring effective pedagogies)

John Lawton, Objective Learning Materials (Year 5 to Year 10)

The Mathomat geometry template can be a powerful tool for learning in both primary and secondary school classrooms. This workshop introduces interesting new features in the Mathomat template range, including the new compass replacing tool, called a TGT, in Mathomat and its related video demonstration series that was developed with Professor Chris Tisdell Hands on drawing and measurement with Mathomat using the angles investigations in the new Mathomat Explorer manual. These encourage confident protractor use through a deeper understanding of the concept of angle. The TGT and investigations in the Explorer manual are used with Mathomat to develop a more robust understanding of secondary school angle measurement by relating angle to arc length. An overview of the new pattern block shapes in Mathomat which with MATH-O-BLOCKS and Mathomat website activities explore secondary level geometric pattern concepts. The new Mathomat whiteboard tool is introduced. Commercial presentation

G17 ASSESSING CHALLENGING TASKS IN THE EARLY YEARS

(Exploring effective pedagogies, Valuing evidence)

Jane Hubbard, Monash University and Hannah Marino, St John XXIII Primary School (F to Year 6)

G18 ENHANCING TEACHERS' UNDERSTANDING OF MULTIPLICATIVE THINKING TO SUPPORT STUDENTS NUMERACY AND FUTURE LEARNING OF KEY **TOPICS IN MATHEMATICS**

(Improving individual and societal outcomes, Exploring effective pedagogies, Valuing evidence)

Mayamiko Malola and Max Stephens, University of Melbourne (Year 3 to Year 8)

Multiplicative thinking has emerged as a key area underpinning the development of numeracy in society and everyday life. There is growing empirical evidence confirming the role of multiplicative thinking in supporting students' learning of key topics in mathematics, and that students' early knowledge of multiplicative thinking is one predictor of future success in using and applying mathematics. Teachers who may not appreciate how multiplicative thinking underpins the learning of other topics in mathematics, may not effectively support students' learning in several important related areas such as fractions. This session will be guided by the findings from our study that explored primary school teachers' pedagogical content knowledge for supporting the development of multiplicative thinking in students, to uncover



SESSION G: Friday, 1.30pm-2.20pm (cont.)

and discuss the links between multiplicative thinking and other topics in mathematics. Interactive practical activities demonstrating how multiplicative thinking connects to other topics in the mathematics curriculum will be covered during the session, with implications for effective classroom pedagogies.

G19 EXPLORING INFECTIOUS DISEASE **MODELS WITH HANDSHAKES**

(Improving individual and societal outcomes, Technology to enhance investigation)

Anthony Morphett, The University of Melbourne (Year 9 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.

G20 ENCOURAGING STUDENT RISK TAKING

(Achieving greater equity, Exploring effective pedagogies)

Deborah Murrell and Rita Nainie, Lavalla Catholic College (Year 7 to Year 10)

It is a common complaint that students are reluctant to take risks in their learning. But do we take risks when teaching the curriculum? In this presentation we offer our experience of designing and using a program to encourage year 10 students to take risks in Maths classes. Through being willing to take risks, our students have developed genuine interest, used Mathematics creatively, and have opinions about the best ways to perform Maths.



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SESSION H: Friday, 2.30pm-3.20pm

H01 MIND YOUR MATHEMATICS LANGUAGE!

(Exploring effective pedagogies, Valuing evidence)

Vicky Kennard, Monash University (F to Year 8)

Mathematics is a language, and how we speak to our students makes a difference! Vocabulary, grammar, and syntax are critical features of any language, including mathematics. In this presentation, I will be looking at some of the common words, phrases and symbols we use when teaching mathematics and how they can lead to confusion and misunderstanding. By being careful with our use of mathematical terms and encouraging our students to use them correctly, we can increase student understanding and success with mathematics.

HO2 WHAT THE HECK IS A REKENREK?

(Exploring Effective Pedagogies)

Amy How, Amy How Limited (F to Year 6)

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

H03 TO KNOW AND GROW YOUR STUDENTS THROUGHOUT AN EVER-CHANGING WORLD.

(Valuing evidence)

Jacinta Browning and Jacqueline Clark, Essential Assessment (F to Year 10)

In this presentation we will introduce our assessment model aligned to the Victorian Curriculum F-10, which supports teachers to make data-informed decisions. As classroom teachers. we will share authentic classroom experiences of our differentiated Numeracy assessment and curriculum model, which diagnostically assesses each student. The presentation

will highlight the use of Individual and whole class data to target each student's Zone of Proximal Development and identify a learning pathway to foster student growth, engagement as well as mapping of students to the National Numeracy Progressions. A special highlight will also include powerful ways to support parent partnerships with schools. All participants will receive 45 day complimentary use of the platform.

H04 TRANSFORMING FUNCTIONS AND LEARNING

(Technology to enhance investigation)

Peter Fox, Texas Instruments (Year 9 to Year 12)

Ask your students to explain why f(x+3) is a translation in the negative x direction but f(x)+3 is a translation in the positive y direction. Sliders might provide visuals, but do they don't necessarily provide understanding? In this session we explore a range of techniques to help understand transformations, including those tricky dilation guestions! A range of tried and tested activities will also be covered to help students remember.

H05 TEACHING MATRICES AND NETWORKS **IN VCE GENERAL MATHEMATICS UNITS 1-4**

(Technology to enhance investigation)

Jess Mount, Mathematical Association of Victoria (Year 11 to Year 12)

Teaching networks and matrices for the first time in VCE General Mathematics can be daunting if the content is unfamiliar. With the change of mathematics study design being implemented in 2023 this session will look at introducing both modules into Units 1 & 2 VCE General Mathematics as well as content for Units 3 & 4. The session will focus on working through typical VCE examination guestions and tips for teaching networks and matrices in VCE General mathematics.

H06 ENABLING & EXTENDING PROMPTS -**ARE WE CATERING FOR ALL?**

(Achieving greater equity, Exploring effective pedagogies)

Eamon Light, Zebra Stripes Education (F to Year 6)

This presentation will explore the importance of planning equitable mathematics learning experiences. It will extend

the notion that enabling and extending prompts are more equations can prove very helpful indeed. In this workshop than just "bigger numbers" and how the quality of lessons is we will discuss the functionality called for in recent exams, dependent on teachers' content and pedagogical knowledge. through the lens of the new Study Design. Video solutions A low floor/ high ceiling learning experience focusing on to the 'top 10' will be shared, with a view to making sure all multiplicative thinking will be used to explore anticipating students have the technology skills they need to learn and student responses and understanding that the key ideas, achieve their best. properties of multiplication and types of division should be H10 CRYPTOGRAPHY IN MATHS considered in collaborative planning.

H07 STUDENT CHOICE IN ASSESSMENT AND OTHER IDEAS TO FOSTER PROBLEM SOLVING

(Improving individual and societal outcomes, Exploring effective pedagogies)

Geoffrey Menon and Ursula Parker, Camberwell High School

(Year 9 to Year 12)

We will discuss a variety of approaches used to foster problem solving at Camberwell High School, including student choice in assessment, mathematical investigations and opportunities within the school's Launch program.

H08 WARM UPS AND LESSON STARTERS TO HOOK IN YOUR STUDENTS

(Improving individual and societal outcomes)

Helen Haralambous, Mathematical Association of Victoria (Year 7 to Year 10)

A key component to engaging students is to get them This workshop will take a hands-on approach, where you hooked in at the beginning of the lesson. In this hands-on 'become the student', to explore and reflect on some practical workshop for teachers of year 7 to 9, participants will explore classroom strategies that facilitate knowledge retention and activities that will warm up students in readiness for the lesson. retrieval. An overview of what the research tells us will also be The activities have potential to cater a multiple levels and provided. engage all students.

H09 CLASSPAD IN YEAR 12 EXAMS -**GENERALLY SPEAKING**

(Technology to enhance investigation)

Alastair Lupton, Adelaide Botanic High School (Year 11 to Year 12)

CAS technology is a part of the learning and assessment in Richard Korbosky, Dualoh Pty Ltd all VCE mathematics courses, but just what functionality, of (F to Year 8) a powerful tool like a ClassPad, is useful in General Maths? Whilst the 'high end' CAS commands might be less useful, Dual-oh maths card games improve students' fluency and functionality involving matrices, recurrence relations, financial understandings of basic facts across different mathematical applications, statistical calculations, and the solutions to ideas using different representations. The maths cards include



CLASSROOM

(Exploring effective pedagogies)

Echo Gu, Lauriston Girls' School and Jiging Sun, Deakin University (Year 7 to Year 10)

This session explores some cryptography algorithms that are suitable for use in secondary school maths classes. It could help students to develop their computational thinking through mathematical modelling. A modern application of mathematics, public key cryptography, is discussed. It highlights various areas of mathematics that underpins the algorithms and lets participants gain an understanding of fundamental cryptographic concepts.

H11 WHY DON'T THEY REMEMBER IT?!

(Exploring effective pedagogies, Valuing evidence)

Antje Leigh-Lancaster, Leigh-Lancaster Consulting (Year 3 to Year 10)

I think many of us have had moments where we're surprised by what our students haven't remembered.

You will leave this session with a range of practical strategies, a summary of the session and links to some related resources.

H12 CARD GAMES WHICH MAKE YOU 'THINK'

(Achieving greater equity, Exploring effective pedagogies, Valuing evidence)



SESSION H: Friday, 2.30pm-3.20pm (cont.)

mathematic curriculum aspects of subitising, partitioning, whole number, number sentences, doubling, halving, times tables, equivalence, fractions, decimals and percentage. Use a strategy that allows you to differentiate the classroom and allows students to self-improve their response times to many mathematical ideas. All card games have the same rules. What changes is the content. The games are focused on improving students thinking (problem solving) and training their brain to see mathematics representations in many different forms. Commercial Presentation

H13 MOTIVATING ALL MATHS LEARNERS TO SUCCEED

(Improving individual and societal outcomes, Exploring effective pedagogies)

Marissa Cashmore, Motivating all Maths Learners to Succeed, Macclesfield P.S. (F to Year 6)

How wonderful would it be to have every student that enters your classroom leave being confident learners of mathematics!? Now more than ever, we are having to work extra hard to undo some of the negative mindsets that have been unintentionally created. This workshop will give you some practical ideas on how to change (and improve) the culture of mathematical learning in your classroom for all learners. In doing so, we will take a look at how we can extend positive mindsets to our parents and colleagues to help improve the learning outcomes for all students.

H15 INCORPORATING TECHNOLOGY IN THE APPLIED LEARNING SPACE

(Technology to enhance investigation)

Tamara Zerafa and Amy Casati, Harvester Technical College (Year 7 to Year 12)

With emerging technologies leading the way in all fields in education, it's important to design engaging lessons and projects that meet the curriculum. This presentation looks at ways of using technology to enhance investigation in Numeracy, specifically in the applied learning space. We'll be looking at Autodesk software, specifically Fusion 360 and Revit to look at designing 3D models that can be 3D printed or using an Epilog Laser to laser cut acrylic.

H16 MATHOLOGY: SUPPORTING YOU TO TEACH YOUR WAY

(Exploring effective pedagogies, Valuing evidence)

Sophie Matta, Pearson Education Australia (F to Year 6)

Designed using best current pedagogy, Pearson Mathology is your on-call maths consultant: a flexible resource built on a research-based learning progression and mapped to all Australian state current and new curricula. It equips teachers to deliver rich, hands-on lessons, activities and formative assessment using age-appropriate and maths-first Little Books and table-top activities. Teacher support on planning, differentiation, extension, assessment, and next steps are all available 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 to access the maths knowledge, teaching strategies and support to teach the key maths concepts, identify misconceptions/extension needs and take appropriate in-the-moment actions that allow every student to progress their maths learning. Commercial Presentation

H17 CLOCKS, CALENDARS AND NOCTURNALS

(Technology to enhance investigation, Exploring effective pedagogies)

Tim Byrne, Educator (Year 5 to Year 8)

Digital calculation of time is now readily available on smart phones but how well could we calculate time passing without such a device? This presentation investigates several analogue methods for telling the time during the day and night as well as future calendar dates. Participants will access some original analogue instruments, namely, sundials, nocturnals and perpetual calendars. Participants will be encouraged to think about how using simple technology or models helps our imagination capture the big picture. The ancients were driven to define the year and the seasons, which led to massive stone astronomical observatories. Today we can nearly do it all in cardboard. Participants construct a working sundial and a nocturnal based on the southern cross. Participants also investigate an algorithm, which can be used to calculate future dates such as birthdays.

H18 VALUING MATHEMATICS LEARNING - A SCHOOL APPROACH

(Achieving greater equity, Valuing evidence)

James Poon, Steven Swenser and Melissa Ross, Mentone Girls' Grammar School (Year 7 to Year 12)

Mathematics continues to be a high stake subject and students know they need to do well in order to have the options in tertiary courses. External expectations as well as personal desire to excel in mathematics continue to heighten the anxiety in learners. To this end, rather than focusing on the results (both teachers and students), we focus on creating an environment that develops students' confidence in learning mathematics. This is introduced at the classroom level, the year level as well as at the school level. In this presentation, we will share our approaches and how we create a learning environment for our students regardless of their abilities that support the learning of mathematics at our school.

H19 CAS IN THE METHODS CLASSROOM (TI NSPIRE)

(Improving individual and societal outcomes, Technology to enhance investigation, Exploring effective pedagogies)

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

The CAS technology is a very powerful learning and teaching tool in the classroom. This session will demonstrate the power and the capability of TI Nspire CX-II technology to analyse and interpret concepts in the Methods class. These subsequently enhance conceptual understanding and learning outcomes. This session each year is an extremely popular session amongst the conference attendees. The attendees also are provided all the source files and other files that may quickly be demonstrated during the course of the session.





PRESENTER LIST

Nadia Abdelal: BO5 Leonie Anstey: A16 Catherine Attard: KF05 Lynda Ball: G14 Alex Blanksby: C15 Janette Bobis: KT01 Jennifer Bowden: B06, D06, G06, OT07, OF07 Alex Box: CO2 Stephen Broderick: G03 Jill Brown: KF02 Jacinta Browning: HO3 Tim Byrne: H17 Jayde Cairns: FO2 Scott Cameron: G14 Jonathan Carter: OT03 Amy Casati: H15 Marissa Cashmore: H13 Jill Cheeseman: G10 Helen Chick: B03. C01 Thomas Christiansen: C15 Jacqueline Clark: H03 Peter Collins: A19 Benjamin Cooper: C14 Kate Copping: A07, C16, G07 Ellen Corovic: D06, F16 Shelley Cross: C11 Evan Curnow: C15 James Dann: D19 Carmel Delahunty: F11 Shane Dempsey: B18, E08 Cathy Devlyn: E03

Jenna Dore: D07 Allan Dougan: B03, C01 Danijela Draskovic: B09, C09 David Dunstan: A06 Hayley Dureau: KT04 Michaela Epstein: A15, E05 Catherine Epstein/Rodgers: A17, B17 Marilyn Fleer: KF01 James Forscutt: G11 Peter Fox: KF03, C18, E09, H04 George Gadanidis: KT05 Rachael Gore: A12 Lauren Gould: E15 Georgia Gouros: F10 Judy Gregg: F11 Andrew Greville: OT05, OF06 Sheila Griffin: G06 Genovieve Grouios: E10 Echo Gu: D11, H10 Marilyn Hand: G08 Stephen Hanlon: B10 Shelley Hannigan: KT03 Helen Haralambous: A08, H08 Anthony Harradine: D03, F03 Julia Hill: A14 Brendan Hodge: D16 Derek Holton: A20 Samantha Horrocks: C14 Amy How: H02 Jane Hubbard: F16, G17 David Innes: F13

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Sophie Matta: H16 Carolyn McCabe: E11 Russell McCartney: D16 Heather McMaster: G12 Kevin McMenamin: A03, E04, OT08, OF03, OF08 Allason McNamara: KF03, E03 Geoffrey Menon: H07 Carmel Mesiti: A07, C16, E20 Sanjeev Meston: BO8, E18, H19 Terence Mills: G01 Daniel Milutinovic: D09 Michael Minas: C06, F06 Rohani Mohamad: CO8 Robert Money: B14 Thomas Moore: KF03 Emma Moore: A09 Anthony Morphett: G19 James Mott: A13 Jess Mount: H05 Deborah Murrell: G20 Rita Nainie: G20 Michael Nelson: D01 Damian Nicholson: D04 Vaughan Nikitin: G05 Andrea O'Connor: A10 Daniel O'Kane: G05 Melanie O'Reilly: KF02 Stephen Paatsch: D08 Jennifer Palisse: C17, E06 Ursula Parker: H07 Bernadette Pearce: E15

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7	Linda Swanepoel: C11
	Steven Swenser: H18
	Wendy Taylor: A20, C05
	Megan Teefey: B06
	Chris Terlich: B07
0	Wee Tiong Seah: B15
2	Alec Titterton D05
	Joel Townsend: F17
	Christina Tropea: E11
E11, OT01,	Rob Vingethoets: F06
	Enzo Vozzo: D14
8, E08 DF07	Robin Wang: OF04
	John West: C10, E10
	Kris Westcott: D17
2	Rachael Whitney-Smith: KF03, D02, F13
05	John Widmer: B14
A05	Andrew Williams: OT06
94	Doug Williams: D15, F14, OT02, OF02, OF10
	Neale Woods: B13, E19
	Guanghua Wu: F08
E15	Robert Yen: A18
	Hannah Young: G04
	Tamara Zerafa: H15
513	
G18	
6	



GENERAL INFORMATION

DATE AND TIME

MAV22 Annual Conference will be an in-person and virtual conference to be held on Thursday 1 December and Friday 2 December with five keynote presentations on each day followed by sessions.

Keynote duration is one hour, and sessions duration is 50 minutes

Morning tea (for in-person delegates): 10.15am - 11.00am Lunch: 12.50pm - 1.30pm Session change over: 11.50am - 12.00pm, 2.20pm - 2.30pm

Thursday sessions will conclude at 3.20pm followed by inperson networking drinks to 4.30pm. Friday sessions and close of conference will be at 3.20pm.

REGISTRATION

Registrations are now open and will close on Friday 18 November 2022. Register now.

WHAT IS INCLUDED?

In-person conference pass will give you access to:

- all sessions in all rooms
- morning tea and lunch in the exhibition hall
- conference satchel and
- 12 months unlimited post-conference access to presentations, publications and resources from rooms 1 to 10.

An online conference pass will give you exclusive access to:

- All keynote speakers and sessions streamed live and ondemand in rooms 1 - 10
- 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

PRIVACY POLICY

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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MAV may use collected information for evaluation and research purposes. All collected information will be protected against loss and unauthorised use or disclosure.

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.

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We are excited to be publishing new editions of our renowned Cambridge Senior Mathematics VCE titles this year, together with new Foundation Mathematics resources for the new VCE Study Design.

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84



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TI has a 75-year history of innovation. Our corporate commitment to STEM started with the company's founders and remains stronger than ever today. We believe in investing in education in order to fuel the talent base needed to continue advancing engineering innovation across the world. Our commitment to education remains one of our highest priorities.



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Evidence-based approaches for effective numeracy and mathematics teaching from birth to Level 10 can be found in the department's Mathematics Teaching Toolkit.

New resources include the Middle Years Maths Challenges and an extension of the Foundation to Level 2 suite of resources includes Flip Make Play Cardsets, a Teacher Guide for the Mathscots animation series. The Mathematics Monographs (research summaries) and Numeracy Across the Curriculum resources for non-mathematics teachers (Level 7 to 10) are now available.



Australian Curriculum

NSW Syllabus

Victorian Curriculum

www.essentialassessment.com.au

Essential Assessment is a best practice Numeracy and Literacy whole-school improvement model aligned to the Victorian Curriculum, Australian Curriculum and NSW Syllabus. We make formative and summative assessment an easy process aligning to each school's teaching and learning program through structured diagnostic assessments and differentiated, personalised curriculum. Our 3-step assessment and curriculum model supports data-driven teaching and instructional leadership to plan and monitor growth.



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www.townsquaredgame.com

Playlunch Games is a start-up Melbourne company founded by digital education development veterans Sarah Mercer and Wil Monte. In early 2022, Playlunch launched the pilot version of Town Squared, a game to help children feel more comfortable and confident with maths.

Designed in collaboration with MAV, Town Squared motivates children to apply and practice the maths they learn at school by making it fun, social and relevant. For use at school or at home, Town Squared also includes resources to help parents understand what they can do to encourage a child's interests and manage their unique challenges. Find out more at www.townsquaredgame.com.



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Dr John West

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https://mathspathway.com

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