



THE MATHEMATICAL  
ASSOCIATION OF VICTORIA

MAV19  
CONFERENCE

5-6 DECEMBER

# MAKING + CONNECTIONS

## MATHEMATICS NUMERACY

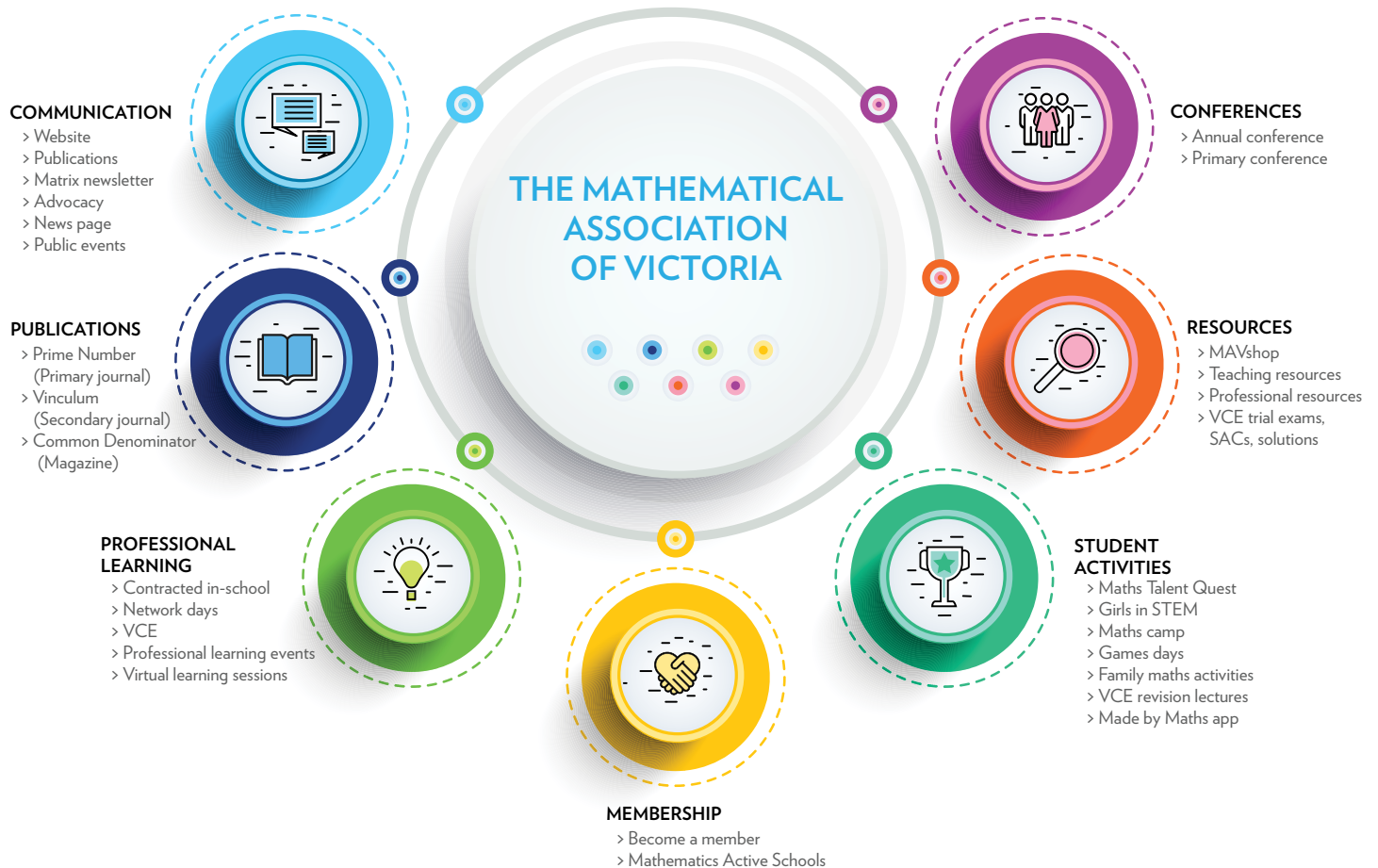
INDUSTRY  
PEDAGOGY  
CURRICULUM  
PROFICIENCIES  
**STEM**  
STUDENTS INDUSTRY PEDAGOGY  
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**STEM**

## CONFERENCE SYNOPSIS

**56th Annual Conference**  
**La Trobe University, Bundoora**

REGISTER NOW · [mav.vic.edu.au/conference](http://mav.vic.edu.au/conference) · #MAVCON  
[mav.vic.edu.au](http://mav.vic.edu.au)



Your MAV membership is  
an essential part of a  
successful career.  
Renew or join today.

# WELCOME TO MAV19



The Mathematical Association of Victoria invites you to the 56th Annual Conference (MAV19) in Melbourne from Thursday 5 – Friday 6 December 2019.

At the heart of MAV's Annual Conference are teachers. Each year over 1400 mathematics

educators including teachers, academics, policy makers, curriculum experts and resource developers come together to share their collective expertise, experiences and ideas. That's what makes our conference great!

Making connections is crucial to the success of mathematics education in the future. Mathematics educators need to work together, across schools, with university, industry partners and various other stakeholders. Educators also need to make connections between curriculum, pedagogy, skills and context to ensure student engagement and growth mindsets.

Making connections will ensure both rigour and innovation, and provide opportunities for increasing impact in mathematics education.

MAV19 Keynotes and workshops will cover six themes:

**Tools and Technology** – explore possibilities for embedding technology and collaborative tools to advance mathematical teaching and learning

**Curriculum/Assessment** – support and enhance excellence through curriculum understanding, planning, delivery and assessment

**STEM** – linking mathematics education to industry and further study

**Networks as Communities of Practice** – working together to achieve excellence in mathematical teaching and learning

**Pedagogical Content Knowledge** – integration of mathematical content knowledge with the skilled teaching of that knowledge

**Context for Learning** – creating connections using contexts for learning

Join us at MAV19 Making+Connections, to form and share your own connections.

- Ann Downton, Conference Convenor

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# SCHEDULE

Thursday 5 December 2019	
8am-8.50am	Registration and expo open
9am-10am	Session A: Keynote presentations
10.15am-10.50am	Morning tea
11am-12pm	Session B: workshops
11am-1.20pm	Session B-C: workshops
12.10pm-1.10pm	Session C: workshops
1.10pm-2.20pm	Lunch
2.30pm-3.30pm	Session D: workshops
2.30pm-4.40pm	Session D-E: workshops
3.40pm-4.40pm	Session E: workshops
4.50pm-5.50pm	Happy hour
Friday 6 December 2019	
8am-8.50am	Registration and expo open
9am-10am	Session F: Keynote presentations
10.15am-10.50am	Morning tea
11am-12pm	Session G: workshops
11am-1.20pm	Session G-H: workshops
12.10pm-1.10pm	Session H: workshops
1.10pm-2.20pm	Lunch
2.30pm-3.30pm	Session I: workshops
2.30pm-4.40pm	Session I-J: workshops
3.40pm-4.40pm	Session J: workshops

# PROGRAM

Thursday 5 December 2019	
8am-8.50am	Registration and expo open
9am-10am	Session A: Keynote presentations <ul style="list-style-type: none"> <li>• A1: Mike Askew</li> <li>• A2: Jill Cheeseman</li> <li>• A3: Geoff Masters</li> <li>• A4: Kate Smith-Miles</li> <li>• A5: Panel discussion</li> </ul>
10.15am-10.50am	Morning tea
11am-12pm	Session B: workshops
11am-1.20pm	Session B-C: workshops
12.10pm-1.10pm	Session C: workshops
1.10pm-2.20pm	Lunch
2.30pm-3.30pm	Session D: workshops
2.30pm-4.40pm	Session D-E: workshops
3.40pm-4.40pm	Session E: workshops
4.50pm-5.50pm	Happy hour

Friday 6 December 2019	
8am-8.50am	Registration and expo open
9am-10am	Session F: Keynote presentations <ul style="list-style-type: none"> <li>• F1: Mike Askew</li> <li>• F2: Janette Bobis</li> <li>• F3: Cassandra Marinopoulos</li> <li>• F4: Hilary Hollingsworth</li> <li>• F5: Greg Oates</li> </ul>
10.15am-10.50am	Morning tea
11am-12pm	Session G: workshops
11am-1.20pm	Session G-H: workshops
12.10pm-1.10pm	Session H: workshops
1.10pm-2.20pm	Lunch (competition draw at 2pm)
2.30pm	Registration and exhibition close
2.30pm-3.30pm	Session I: workshops
2.30pm-4.40pm	Session I-J: workshops
3.40pm-4.40pm	Session J: workshops

## KEYNOTE PRESENTATIONS

In 2019 there will be five Keynote Presentations at the beginning of each day. You will need to choose one of these to attend.

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

## EXTENDED SESSIONS

There are four extended sessions, B-C, D-E, G-H and I-J. These sessions run over two hour sessions plus the break in between (length will vary depending on presenter/topic). If you are attending an extended session, for example B-C, this would replace your choices for both sessions B and C.

## MAV19 CONFERENCE THEMES

Keynotes and workshops at MAV19 will cover six themes:

**Tools and Technology** – explore possibilities for embedding technology and collaborative tools to advance mathematical teaching and learning

**Curriculum/Assessment** – support and enhance excellence through curriculum understanding, planning, delivery and assessment

**STEM** – linking mathematics education to industry and further study

**Networks as Communities of Practice** – working together to achieve excellence in mathematical teaching and learning

**Pedagogical Content Knowledge** – integration of mathematical content knowledge with the skilled teaching of that knowledge

**Context for Learning** – creating connections using contexts for learning

# KEYNOTES

THURSDAY 5 DECEMBER 2019



**A1: MIKE ASKEW**

F-8

**PROFESSOR OF  
MATHEMATICS EDUCATION  
UNIVERSITY OF  
WITWATERSRAND,  
JOHANNESBURG**

## REASONING AS A MATHEMATICAL HABIT OF MIND

### Curriculum/Assessment

Of the four proficiencies – understanding, fluency, problem solving and reasoning – reasoning is often seen, I think, as the ‘gold standard’ of mathematics: harder to learn than the other fluencies and only accessible to a minority of learners.

An alternative view – one that I share – is that mathematical reasoning is actually an extension of the sort of everyday reasoning that we all engage in throughout our lives.. From that perspective, engaging in mathematical reasoning should be accessible to all learners and not just the select few. And contrary to another popular belief, reasoning is not necessarily dependent on fluency needing to be taught first. So rather than treat reasoning as something special and difficult in mathematics teaching, what would it look like to have it happening ‘little and often’ in all mathematics teaching, so that all pupils come to develop reasoning as a ‘habit of mind’?

In this plenary I will share some of the research into how we can support everyone reason mathematically and suggest some practical examples for bringing reasoning into the centre of mathematics lessons, conferences on mathematics, leadership and thinking. Topics have included professional learning teams, questioning, curriculum and leadership practices.

Professor Askew’s keynote presentation is sponsored by



Education  
and Training



**A2: JILL CHEESEMAN**

F-2

**SENIOR LECTURER,  
EDUCATION, MONASH  
UNIVERSITY**

## LEARNING FROM CHILDREN

### Context for learning

Learning and teaching mathematics fascinates me and I know that some of the important things I have learned have come from children. In this session, I will share some stories that are memorable to me to illustrate ways in which children’s ideas and actions have left indelible imprints on my thinking, inspired me to be a better teacher, and amazed me with their insights.

As a teaching profession, I think we share our practice through our narratives. Maybe in some cases the stories are apocryphal but those I will recount are real and come from classrooms. I will connect each story to a research project, a professional development initiative or a kind invitation to problem-solve with children. The power of these stories is to highlight socio-cultural issues in mathematics education, equity and access issues, theoretical perspectives, and the personal qualities of young mathematicians. In particular, children have reminded me of the curiosity, creativity, persistence and knowledge that they can bring to the pursuit of mathematics. My reflections serve as one example of the ways in which teachers, and teacher educators, learn with children. I hope that participation in this session will prompt teachers to consider their experiences and how they have been learning from children.



**A3: GEOFF MASTERS AO**

F-12

**CEO, AUSTRALIAN COUNCIL FOR EDUCATIONAL RESEARCH (ACER)**

**CONNECTING TEACHING TO STUDENT READINESS**

**Curriculum/Assessment**

In each year of school, the most advanced students in mathematics are at least five to six years ahead of the least advanced students, with some evidence that this gap widens across the years of school. This is an issue if teachers understand their role as the delivery of the same mathematics curriculum to all students in a year level. Many less advanced students lack the prerequisite knowledge to engage meaningfully and so fall further behind each year. Other, more advanced, students often are not challenged and extended to the levels of which they are capable. One approach to this issue has been to create different mathematics streams, but this risks labelling, locking students into particular streams, and setting ceilings on how far some students can progress. This keynote considers an alternative structure for the school mathematics curriculum – one that would see all students progress through a sequence of attainment levels not linked directly to year levels.

Professor Masters keynote presentation is sponsored by



**A4: KATE SMITH-MILES**

7-12

**PROFESSOR OF APPLIED MATHEMATICS, UNIVERSITY OF MELBOURNE**

**MYTHBUSTING MATHEMATICS**

**Context for Learning and STEM**

This talk tackles some of the many myths about mathematics that affect student perceptions, and equips teachers to respond with debunking examples. The foundational aspect of the school mathematics curriculum can make it difficult for students to see the relevance to the real world and their future.

The role of mathematics in tackling many of societies greatest challenges will be discussed, and the reason that mathematics consistently ranks as the top job in an annual world survey of occupations will be explained. Finally, some classroom suggestions will be offered to help students see that - far from being a dusty old and irrelevant subject - new mathematics is being developed all the time in response to society's needs.

Professor Smith-Miles's keynote presentation is sponsored by





**A5: PANEL DISCUSSION**

7-12

**WHAT'S UP WITH SECONDARY SCHOOL MATHEMATICS, AND HOW CAN WE IMPROVE IT?**

**Context for Learning, Pedagogical Content Knowledge and Curriculum/Assessment**

We often hear that learning maths teaches reasoning, problem solving logical, and critical thinking skills. Students can develop a host of technical skills but if they lack the capacity to apply these skills to solving problems which are anything other than technical exercises, their knowledge is irrelevant. A critical skill in mathematics is being able to derive a mathematical formulation from a context. Yet we also know that many students leave school not having mastered essential numeracy skills.

What should the role of school mathematics education be in our emerging new world? And as such, what mathematical ideas should students be required to engage with? Why are topics like algorithmic thinking and coding relevant to secondary school mathematics?

Are we pushing kids too far by asking them to do maths until Year 10? Are we doing enough to combat maths anxiety in the secondary school maths classroom? What are the factors leading to this anxiety, and are we doing enough to address them?

What if maths was elective from Year 9 like other subjects? Couldn't students get enough numeracy across the curriculum after Year 10 that maths was not needed anyway? If maths was not compulsory teachers may need to improve their practice and work harder to recruit and retain students in maths subjects. Teachers could then focus on those who are interested in maths, leading to more students taking higher level mathematics than currently; do you agree?

Come along and explore these topics with our panel of experts from across the maths education sector.



**MC: KYLIE SLANEY**

MAV Board member, and Teacher Mathematics and Digital Technologies, Carey Baptist Grammar School.



**SARAH BUCKLEY**

Research Fellow, The Australian Council for Educational Research (ACER).



**SEBASTIAN SARDINA**

Senior Research Fellow in Artificial Intelligence, School of Computer Science and Software Engineering, RMIT University University.



**PETER GOSS**

School Education Program Director, GRATTAN Institute.



**NEIL CARMONA-VICKERY**

Acting Director, Monash Tech School



**F1: MIKE ASKEW**

F-8

**PROFESSOR OF  
MATHEMATICS EDUCATION  
UNIVERSITY OF  
WITWATERSRAND,  
JOHANNESBURG**

**BIG IDEAS: CONNECTING WITHIN AND  
ACROSS THE MATHEMATICS CURRICULUM**

**Curriculum/Assessment**

Teaching and learning mathematics is sometimes treated in a bottom-up approach, by selecting and ordering a number of small objectives that, we hope, enable learners to get a sense of the ‘big picture’ over time.

Complementary to this is looking for connections within and across mathematics that can inform teaching and learning over time in ways that helps learners understand mathematics as a coherent network of ideas. Thinking about the Big Ideas in teaching and learning mathematics is central to adopting such a perspective in the mathematics classroom

In this keynote Mike will explore some of the Big Ideas in mathematics and how they can support teaching that not only focuses on reasoning and problem solving, as well as fluency, but develops understanding over time by building on, connecting and refining ideas, rather than continually introducing new ones.

Professor Askew’s keynote presentation is sponsored by



Education and Training



**F2: JANETTE BOBIS**

F-4

**UNIVERSITY OF  
SYDNEY**

**CHALLENGE AND  
ENJOYMENT: GETTING  
THE RIGHT BALANCE IN  
PRIMARY MATHEMATICS  
CLASSROOMS**

**Pedagogical Content Knowledge**

Coupled with the desire to foster students’ mathematical reasoning, is the need to nurture their enjoyment of learning mathematics from a young age. In this presentation I focus on challenging mathematical tasks for the early years primary classroom and suggest teaching and learning strategies to help teachers maintain and build young students’ enjoyment of mathematics.





**F3: CASSANDRA  
MARINOPOULOS**

7-12

**2018 VICTORIA  
EDUCATION EXCELLENCE  
AWARDS OUTSTANDING  
SECONDARY TEACHER  
WINNER, BERWICK  
COLLEGE**

## **A STORY OF CHANGE: TRANSFORMING HOW MATHEMATICS IS TAUGHT**

### **Networks of Communities of Practice**

Berwick Secondary College has worked over an extended period of time to drive change in how mathematics is taught, and how student learn. This journey has involved supporting teachers to develop their capacity as expert mathematics practitioners. This was achieved through many approaches, but central to success was the development of a culture of collaboration and reflection. Teachers at Berwick are asked to reflect on their practice in the classroom on a regular basis. Student voice is important in the process, as is peer to peer feedback. Join me to hear about the challenges of leading change, the successes achieved, and gain some insights into creating your own change plan for your school.



**F4: HILARY  
HOLLINGSWORTH**

F-12

**SENIOR RESEARCH  
FELLOW ASSESSMENT AND  
REPORTING: MATHEMATICS  
AND SCIENCE RESEARCH  
PROGRAM. AUSTRALIAN  
COUNCIL FOR  
EDUCATIONAL RESEARCH  
(ACER)**

## **MATHEMATICS TEACHING, LEARNING, ASSESSMENT AND REPORTING: TIME TO JOIN THE DOTS**

### **Curriculum/Assessment**

If making connections is seen as crucial to the success of mathematics education in the future, and we aspire as mathematics educators for student engagement and growth mindsets, then how might we remedy the disconnect between recommended approaches to mathematics teaching and learning and existing arrangements for mathematics assessment and reporting? This keynote will explore this question through: highlighting current policy and practice landscapes related to teaching, learning, assessment and reporting; presenting perspectives of key stakeholders related to how reporting might better communicate learning progress; and positing some principles for creating stronger connections between mathematics teaching, learning, assessment and reporting.

FRIDAY 6 DECEMBER 2019



F5: GREG OATES

7-12

UNIVERSITY OF  
TASMANIA

INTUITION AND COGNITIVE  
CONFLICT: FROM 'UH-OH'

TO 'AH-HA'

### Pedagogical Content Knowledge

Student's ability to engage with challenging tasks often requires them to take risks and to build on initial intuitions they may have about the problem. However, students can frequently doubt their intuitions and be afraid to pursue them for fear of being wrong. Following your intuitions down sometimes blind alleys is a natural part of authentic mathematical enquiry. This presentation will demonstrate strategies that encourage students to take risks and not be afraid of being wrong. We will explore tasks that are deliberately designed to go against students' intuitions or beliefs about mathematics they have previously constructed. With considered approaches we can successfully move students towards 'Ah-Ha' moments of positive discovery and growth. Such tasks can be used to help students build conceptual connections across all curriculum levels. This presentation is targeted for Year 7 to senior secondary teachers.

# MAVSHOP

<http://shop.mav.vic.edu.au>

## MAV MEMBERS RECEIVE A 20% DISCOUNT



### RECONCEPTUALISING MATHS AND SCIENCE TEACHING AND LEARNING

F-  
VCAL

How do we enable young people to imagine themselves as the next generation of STEM professionals? How do we do this in a way that engages the desire to learn and explore?

In Australia, there is increasing concern at the declining participation in advanced-level school mathematics and physical sciences; fewer students electing to study STEM programs at university; and, evidence of declining performance of Australian students on international comparative tests in mathematics and science. This timely book highlights the need to Reconceptualise Maths and Science Teacher Education Programs (ReMSTEP) in order to revitalise maths and science teaching approaches within primary and secondary schools.

\$46.44 (MEMBER)  
\$58.05 (NON MEMBER)



### MORE PROBLEM SOLVING: THE CREATIVE SIDE OF MATHEMATICS

8-  
VCE

Be prepared to slice through cubes, lick stamps and limit the number of aliens allowed on a space ship and along the way spot the patterns, make conjectures, move towards a result and just maybe develop its proof. This book suggests different approaches to the solutions of a number of problems, such as the towers of Hanoi, tiling with polyominoes and an equi-probable dice game. Readers are encouraged to leave the text to do their own thinking and then return either in triumph or frustration! Accessible to most secondary students with a knowledge of number and some basic logic skills, this book provides lots of opportunities for problem solving and reasoning.

\$42.26 (MEMBER)  
\$52.83 (NON MEMBER)

TO ORDER  
<http://shop.mav.vic.edu.au>  
OR CALL +61 3 9380 2399



THE MATHEMATICAL  
ASSOCIATION OF VICTORIA

# GENERAL INFORMATION

## CONFERENCE VENUE

La Trobe University, Kingsbury Drive, Bundoora, Victoria.  
Closest car park to Union Hall is carpark P3.

### CAR PARKING

Car parking at La Trobe University for MAV19 conference is included. Please ensure that you enter your vehicle registration number when registering. If you do not register your vehicle registration number, you will be required to PAY via the ticket machine on the day.

The car park rate for 2019 has increased to \$5.80 per day or \$1.60 per hour. Car parking is only available in white bays. If you have not provided your vehicle registration number, when registering for MAV19, you will be required to purchase your own tickets via the cellopark Pay As You Go application or via the ticket machines located in each car park.

**No reimbursement is available on the day.**

Further car park details can be found at:

[www.latrobe.edu.au/transport-central/car-parking/melbourne-parking/fees](http://www.latrobe.edu.au/transport-central/car-parking/melbourne-parking/fees)

## NETWORKING DRINKS

Date: Thursday 5 December 4:50pm - 5:50pm  
Venue: Exhibition, Main Hall, Union Building

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

Please indicate whether you will be attending this event when registering online.

## CONFERENCE OFFICE CONTACT

Jacqui Diamond – Events Manager  
Phone: + 61 3 9380 2399  
Mobile: 0422 849 950  
Email: [jdiamond@mav.vic.edu.au](mailto:jdiamond@mav.vic.edu.au)

The Mathematical Association of Victoria  
61 Blyth St, Brunswick VIC 3056  
Phone: + 61 3 9380 2399  
[www.mav.vic.edu.au/conference](http://www.mav.vic.edu.au/conference)

## CANCELLATION POLICY

Participants who cancel their booking on or prior to Friday 15 November 2019 will receive a refund less a \$30 administration fee. All cancellations **must** be in writing and include any documentation already sent out. **No refunds** are available after Friday 15 November 2019. Registration may be transferred to another person.

## REGISTRATION INFORMATION

### Registration fees

MAV Member Metro: one day	\$294
MAV Member Metro: two days	\$589
MAV Member Non-Metro: one day	\$239
MAV Member Non-Metro: two days	\$479
Non Member: one day	\$377
Non Member: two days	\$764
Student: one day	\$157
Student: two days	\$314

*Happy hour (Thursday 5 December), morning tea and lunch are free to registered delegates. All prices include GST.*



The image shows a sign for La Trobe University car parking. At the top left is the La Trobe University logo. Below it is a red circle containing a white car icon. Underneath the circle is a red banner with the text 'CAR PARKING' in white. Below the banner, there is text explaining the Pay-as-you-go (PAYG) parking system and providing a website for more information.

LA TROBE UNIVERSITY

ICON: 9609 CRICOS Provider 00151M

**CAR PARKING**

La Trobe University uses Pay-as-you-go (PAYG) parking so you pay only for the time you use. Payment can be made via app, phone or online. For more information, please visit [latrobe.edu.au/transport-central](http://latrobe.edu.au/transport-central)

## MORNING TEA

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

# REGISTRATION

## Before you register you will need:

1. Your username and password to register online, if unsure ring the MAV office on +61 3 9380 2399.
2. School purchase order number or credit card for payment (only Visa and MasterCard are accepted).
3. Download the synopsis and select your sessions ready to enter your selections online when you register.

## To register

1. Visit <https://www.mav.vic.edu.au/conference/mav19-conference.html>
2. Log in using your username (email) and password.
3. Choose your sessions, social program, accommodation (if applicable) and complete the registration process.
4. Check the summary and amount you have been charged.
5. Click on either purchase order or pay online and submit your payment to complete the registration process.
6. Print out a copy of your confirmation for your records.
7. You'll get an automatic email which includes an invoice or receipt, confirming your registration.
8. If receiving an invoice, approve and pass your invoice to your accounts team to be paid ASAP to secure your place. Invoices have 14 day terms for payment.

If you do not receive this email within an hour, contact MAV on 9380 2399.

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

## Inclusions

The registration fee includes (per person) - morning tea and lunch for each day registered; attendance at selected sessions; networking drinks on Thursday 5 December; and access to industry exhibition. And parking if your registration number is supplied by the cut off date.

## Notes

- Registrations will not be deemed complete without full payment or a school purchase order number.
- Session numbers are limited and the website will indicate when sessions are full.
- Member rates apply to MAV individual members, institutional/school members, Australian Mathematics Associations who are members of AAMT, and New Zealand Mathematics educators who are member of NZAMT.
- The MAV reserves the right to cancel presentations if minimum numbers are not reached.

**REGISTRATIONS CLOSE  
FRIDAY 15 NOVEMBER 2019 AT 5PM**

# ACCOMMODATION

This year accommodation at Mantra Hotel and Breakfree Bell City will be available directly with the hotels.

To make bookings please contact the reservations team and mention 'Mathematical Association of Victoria' to receive your discounted rate.

Email: [bellcity.res@mantra.com.au](mailto:bellcity.res@mantra.com.au)  
Phone: 03 9485 0380

Bookings available on the below rates between 3 December 2019 - 7 December 2019

## MANTRA BELL CITY, PRESTON

Located a short 10-minute drive from La Trobe University, this is a 4-star hotel. A shuttle bus will operate between Mantra and La Trobe University on the Thursday and Friday of the conference. The below prices do not include breakfast.

1 Bed Manhattan: \$160 per night room only (book by 30 June 2019 to receive an early bird special of \$150 per night).

2 Bed Manhattan: \$220 per night room only (book by 30 June 2019 to receive an early bird special of \$210 per night).

Breakfast may be pre-booked with their reservations for a discounted rate of \$25 per person @ Chill Restaurant and car parking for a discounted rate of \$9 per day.

# EXHIBITOR PASSPORT

## BREAKFREE BELL CITY, PRESTON

Located next to Mantra, this is a 3-star hotel. A shuttle bus will operate between Breakfree Bell City and La Trobe University on the Thursday and Friday of the conference. The below prices do not include breakfast.

Sleep & Go Queen	\$110 per night room only
Sleep & Go Twin	\$110 per night room only
Budget Double	\$84 per night room only
Budget Single	\$69 per night room only

Breakfast may be pre-booked with their reservations for a discounted rate of \$20 per person @ Chill Restaurant and car parking for a discounted rate of \$9 per day.

## SHUTTLE BUS

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

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

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

### Thursday 5 December

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

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

### Friday 6 December

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

Departure La Trobe Uni Bus Shelter to Moat Drive Mantra Bell City: 5pm, 5.45pm

## LA TROBE UNIVERSITY

### Student Rooms - Glenn College

Glenn College is located on campus at La Trobe University. The rooms are student rooms, utilised throughout the year by students and are generally small in nature. Please note that there will be several other patrons staying at the college during your stay and consequently there may be some noise. Rooms consist of a single bed with linen. Bathrooms are shared, allocated at 1 bathroom for every 4 rooms. You will need to bring your own toiletries and soap. The price does not include breakfast.

Student room: \$80 per room/per night

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

## PARTICIPATE IN THE EXHIBITOR PASSPORT PROGRAM FOR A CHANCE TO WIN PRIZES!

Each attendee will receive a Passport Program form in their conference satchel. This passport program will also include the location map.

Here's how to enter:

- Visit each exhibitor who is participating in the Passport Program for an engaging conversation or product demonstration.
- Exhibit representative will place a stamp on the Passport Program form.
- If you wish to go in the draw for Thursday prizes, drop your Passport Program off at registration desk after end lunch. You will be entered in the Happy Hour draw. If you are attending Friday only, drop your passport program off at registration desk before 1.30pm.
- Drawings will be held on Thursday 5 December (at happy hour) and Friday 6 December (at 2pm) in the Exhibitor Hall.
- **WINNER MUST BE PRESENT TO COLLECT PRIZE!**

Passport Program is open to all MAV19 registered delegates and excludes exhibitors. Only one passport program form per registered attendee will be accepted as a valid entry. All contact information must be completed on the passport form to be eligible for the prize drawing.



# LUNCH OPTIONS

During your time at La Trobe University for the MAV19 Conference, several food outlets across the University will be serving lunch to conference delegates. Once registered, your email confirmation of registration will contain your lunch voucher. This will entitle you to a MAV19 Conference Package Lunch at the following campus outlets:

- The Eyrie (Eagle Bar)
- Pings Café Moat
- B&B Café (AgriBio)
- Bachelor of Coffee
- Café Spice
- Café Veloci
- Caffeine Café
- Charlies Kebabs
- Fuel Juice
- Fusion
- Grafali's Coffee Roasters
- Grain Express
- House of Cards Expresso
- Mamak Rice and Noodle
- Thanh Thanh
- Writers Bloc Café

When completing your registration form you **MUST** select which outlet you would like to get lunch from, for each day you are attending. If nothing has been selected your default will be Ping's Café Moat.

## UNION BUILDING

### The Eyrie (Eagle Bar)

Grilled chicken salad, soba noodles, spring onions, coriander, chilli, red cabbage, sesame soy dressing. Bottle of water and a cookie.

### Pings Café Moat

#### Thursday

Lemon chicken, stir fried mixed vegetable, steamed rice, Bottle of water or can of Coke.

#### Friday

Mongolian beef, stir fried mixed vegetable, steamed rice, Bottle of water or can of Coke.

## AGRIBIO

### B&B Cafe

Choice of chicken parma, salad and chips; nasi goreng; baked potato with pulled beef, rocket, slaw, sour cream and cheese; pumpkin and pine nut risotto (v). Soft drink or bottle of water.

## AGORA SQUARE

### Bachelor of Coffee

#### Option 1: Chicken schnitzel pack

Chicken schnitzel, cheese and coleslaw on a fresh ciabatta roll. Soft drink, water or small coffee/tea. Piece of fruit. Mini pastry or iced donut.

#### Option 2: Vegetarian pack

Falafel and salad wrap. Soft drink, water or small coffee/tea. Piece of fruit. Mini pastry or iced donut.

### Café Spice

Large combination of any two curries served with rice from a selection of three meat and three vegetarian curries. Indian sweet dessert (Gulab Jamun). Soft drink or bottle of water. All vegetarian curries are vegan, curries do not contain nuts and are gluten free and all foods served is Halal.

### Café Veloci

Main meal, a piece of fresh fruit (banana or apple), cold drink (water, juice, Coke, Pepsi), chocolate treat. Main meal options: roasted chicken sandwich; chicken schnitzel roll/wrap; beef and salad roll; chicken, avocado aioli pasta salad; Caesar salad; chicken schnitzel salad; variety of meat pizzas and pastas. Main meal vegetarian options: falafel Tabouli and Humus Wraps (vegan); potato and egg salad; quinoa brown rice super-food salad (vegan), mixed grain salad (vegan), mediterranean pasta salad, garden salad. Variety of vegetarian pizzas and pastas

Any special dietary requirement can be provided upon request at least one day earlier.

### Caffeine Café

One meal, drink, fruit or sweet treat. Main meal choices include: vegetarian baguette, smoked salmon baguette, chicken and avocado baguette, gourmet wrap, chicken wrap, falafel wrap, two pack homemade Vietnamese rice paper rolls, three homemade sushi, quinoa salad or Poke Bowl (Thursday), Soba noodle or Poke Bowl (Friday), Banh Mi, two Steamed Bao. Regular drink (coffee, water, juice, can of soft drink), assorted fresh fruit or melting moment (sweet treat). A separate lunch pack can be prepared for delegates who are vegan, gluten free, dairy free, nut free, lactose free. Delegates with dietary requirements must visit the cafe prior to 10.30am on the day to confirm collection.



## Charlies Kebabs

Choice of open kebab or small kebab, can of drink or bottled water and a sweet (baklava or Turkish delight). Open kebab is lamb, chicken or falafel served with salad and fries topped with tzatziki, hummus or chilli dip. Vegan and vegetarian platters available. Small kebab is a wrap with tomato, lettuce, onion with a choice of sauces served with a side of fries.

## Fuel Juice

### Option 1: Lunch box

Wholemeal wrap, small fruit salad, yoghurt with museli, healthy bar, water or iced tea.

### Option 2: Fresh salad

Large chicken or vegetarian salad. Water and a piece of fruit or a small juice.

## Fusion

Burger or 4 Burek or small salad, all served with chips and drink. Ribs, 3 Burek and drink.

## Grafali's Coffee Roasters

Any lunch option with coffee or soft drink and a piece of fruit. Options include toasted sandwiches, croissants, filled muffins, filled paninis, salads and sausage/vegetarian rolls. Vegetarian and gluten free options can be provided.

## Grain Express

Large meal, can of drink. A variety of vegetarian options including fried rice, noodles, dumplings, laksa and Tom Yum.

## House of Cards

Regular coffee, classic jaffle and choice of daily treat or small potato gems.

## Mamak Rice and Noodle

Bottle of water or can of soft drink with noodle or rice box (chicken, beef or vegetarian). Sauces include special chilli, satay, Teriyaki, black bean or sweet and sour. Vegetarian, gluten free, Halal chicken and beef dishes available.

## Thanh Thanh

Rice/noodles with any two dishes in the bain-marie (selection of Asian foods, vegetarian, chicken/beef/pork with seafood options available), with drink (soft drink can or bottle of water) and sliced fruit.

## Writers Block

Freshly baked Swiss pastry with a slice and coffee or bottle of water. Vegetarian, gluten free available.

MATHEMATICS TEACHING

**toolkit**



The Mathematics Teaching Toolkit is a suite of comprehensive, multimodal resources designed to support teaching and learning in numeracy and mathematics from birth to Level 10.

The toolkit is designed to:

- strengthen practitioners' confidence and capability in teaching numeracy proficiencies and mathematics
- increase students' engagement and achievement in mathematics
- support families to develop more positive attitudes towards mathematics.

The toolkit will be available soon.

For more information visit:

[www.education.vic.gov.au/numeracyportal](http://www.education.vic.gov.au/numeracyportal)



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Find out more about the TI-Nspire™ CX II graphing calculator at [education.ti.com/aus/Nspire](https://education.ti.com/aus/Nspire).

# SESSION SUMMARY: THURSDAY

THURSDAY 5 DECEMBER 2019

## SESSION A: KEYNOTE, 9AM-10AM

<b>A01</b>	F - Y8	Reasoning as a mathematical habit of mind <i>Mike Askew</i>
<b>A02</b>	F - Y2	Learning from children <i>Jill Cheeseman</i>
<b>A03</b>	F - Y12	Connecting teaching to student readiness <i>Geoff Masters AO</i>
<b>A04</b>	Y7 - Y12	Mythbusting mathematics <i>Kate Smith-Miles</i>
<b>A05</b>	Y7 - Y12	What's up with secondary school mathematics, and how can we improve it? <i>Kylie Slaney, Sarah Buckley, Sebastian Sardina, Peter Goss and Neil Carmona-Vickery</i>

For a full description of keynotes, see page 5.

## SESSION B: 11AM-12PM

<b>B01</b>	Y11 - 12	2018 Specialist Mathematics Examinations <i>Allason McNamara, Dean Lamson, Philip Swedosh</i>
<b>B02</b>	F - Y6	Warm Ups: More Than Just Tuning In <i>Marissa Cashmore, Laura MacLean</i>
<b>B03</b>	Y3 - Y8	Bringing Maths Learning to Life <i>Dianne Liddell</i>
<b>B05</b>	F - Y8	Embedding numeracy across the school: it's more than just mathematics <i>Lee-Anne Pyke</i>
<b>B06</b>	F - Y6	Differentiating learning through Success Criteria <i>Paul Staniscia</i>
<b>B07</b>	F - Y6	Approaches to support planning for student-centred learning in mathematics <i>Aylie Davidson</i>

<b>B08</b>	F - Y10	VCAA Mathematics Annotated Work Samples <i>Crystal Afitu, David Leigh-Lancaster</i>
<b>B09</b>	Y7 - Y10	Coding in the Maths Classroom <i>Georgia Gouros</i>
<b>B10</b>	Y7 - Y12	Further More Mathemagical Marvels to liven up lessons <i>Andrew Wrigley, Wally Brodar</i>
<b>B11</b>	Y7 - Y12	Getting Started With FX Draw <i>Paul Hooper</i>
<b>B12</b>	Y7 - Y12	Using manipulatives in the High School classroom <i>Vicky Kennard</i>
<b>B13</b>	Y7 - Y10	More Puzzles, problems and tricks of the trade <i>Mike Ristovsky, Andrew Jefferies</i>
<b>B14</b>	F - Y10	Brain Training Maths Card Games <i>Richard Korbosky</i>
<b>B15</b>	Y7 - Y10	Essential Mathematics for the Victorian and Australian curriculums <i>VJ Gunawardana</i>
<b>B16</b>	Y2 - Y10	Exploring eTasks <i>Douglas Williams</i>
<b>B17</b>	Y5 - Y10	Developing fractional and algebraic thinking in middle years <i>Catherine Pearn, Max Stephens</i>
<b>B18</b>	Y7 - Y10	Making Connections <i>Mike Clapper</i>
<b>B19</b>	F - Y6	COMBO- extending the original game to take it much further <i>Sue Gardiner</i>
<b>B20</b>	F - Y6	A handful of favourites: Explore a collection of context rich investigations <i>Ellen Corovic</i>
<b>B21</b>	Y7 - Y10	Using Computers in a Maths Classroom with Year 7-10 Students <i>Robert Rook</i>
<b>B22</b>	F - Y10	Reflection and Metacognition in The Mathematics Classroom <i>Genovieve Grouios</i>
<b>B23</b>	Y7 - Y12	Mathematical ideas in the game of SET <i>Amie Albrecht</i>

# SESSION SUMMARY: THURSDAY (cont.)

<b>B24</b>	Y11 - Y12	Maximum fun with calculus <i>Peter Fox</i>
<b>B25</b>	Y7 - Y12	Connecting numeracy, mathematics and the world of work <i>Dave Tout</i>
<b>B26</b>	Y5 - Y8	Really different Number and Geometry Activities ... yes really!! <i>Ian Bull</i>
<b>B27</b>	Y7 - Y12	La Trobe Bendigo's new maths enhancement program Michael Payne, Toen Castle
<b>B28</b>	Y11 - Y12	Using Mathematica as an effective tool <i>Brian Stokes</i>
<b>B29</b>	Y7 - Y12	This one simple hack boosts maths learning <i>Bryn Humberstone, Katie White</i>
<b>B30</b>	F - Y6	Moving maths intervention into the whole class setting <i>John Hein, Rebecca Forder, Rebecca Kerr</i>
<b>B31</b>	Y6 - Y7	Are your students ready for Year 7 maths? <i>Wendy Taylor</i>
<b>B32</b>	Y11 - Y12	Widgets and UDFs in the classroom using TI-Nspire <i>James Mott</i>
<b>B33</b>	Y9 - Y10	Classic Geometric Constructions <i>Neale Woods</i>
<b>B34</b>	Y7 - Y12	AI - Machine Learning and Algorithmics <i>Craig Bauling</i>
<b>B35</b>	Y5 - Y10	My Students Don't Know Their Tables! <i>Michael O'Reilly, Norrian Rundle</i>
<b>B36</b>	Y11 - Y12	ClassPad Tips and Tricks <i>Charlie Watson</i>
<b>B37</b>	Y11 - Y12	Investigating Integer Square Roots of Complex Numbers <i>Ray Williams, Katie Bye</i>
<b>B38</b>	Y7 - Y12	Valuing student work in mathematics at Camberwell High School <i>Geoffrey Menon, Ursula Parker</i>
<b>B39</b>	Y7 - Y12	Finding gaps in student learning! Are you struggling to engage middle school students in the maths classroom? <i>Adam Kruger</i>

## SESSION B-C: 11AM-1.20PM

<b>B-C01</b>	F - Y2	Developing early maths concepts through play <i>Leah O'Neill</i>
<b>B-C02</b>	F - Y6	Embedding Active Pedagogy into Teacher Education targeting Mathematics: Transform-Ed! <i>Paul Dann</i>
<b>B-C03</b>	F - Y8	Teacher student collaboration: promoting mathematical creativity and curiosity. <i>Kristie Gibson, Melissa Sokol, Lana Fleiszig</i>
<b>B-C04</b>	Y11 - Y12	Constructing statistical application tasks in Further Mathematics <i>Peter Jones</i>
<b>B-C05</b>	Y7 - Y12	Masterclass: Thrive and survive: The first five years of secondary school teaching! <i>Danijela Draskovic, Helen Haralambous</i>
<b>B-C06</b>	F - Y10	You don't need to differentiate everything - it's the Big Ideas that make a difference! <i>Dianne Siemon</i>
<b>B-C07</b>	F - Y12	Why Numeracy and why now? <i>Kerryn Sandford</i>
<b>B-C08</b>	Y7 - Y12	A day in the life of a Mathspace teacher and student <i>Craig Blake</i>

## SESSION C: 12.10PM-1.10PM

<b>C01</b>	Y11 - Y12	2018 Math Methods Examinations <i>Allason McNamara, Mary Papp</i>
<b>C02</b>	Y7 - Y10	Free resources for delivering excellence in financial literacy <i>Damian Nicholson</i>
<b>C03</b>	Y - Y10	Targeted Teaching through a Learning Progression in Geometric Reasoning <i>Marj Horne</i>
<b>C04</b>	F - Y4	Connecting mathematics to the real world! <i>Pam Vilsten, Matthew Ferguson</i>



<b>C05</b>	F - Y6	Making Maths Engaging for Students AND Teachers! <i>Bernard Kerrins</i>
<b>C06</b>	F - Y6	Mathematically Rich Tasks in Primary Schools <i>Russell McCartney, Chris Terlich</i>
<b>C07</b>	F - Y8	Strategies for understanding geometry – make it, draw it, name it, know it <i>Richard Korbosky</i>
<b>C08</b>	Y11 - Y12	Making connections through games in VCE Maths <i>Rosalind Willsher, Emily DiBella</i>
<b>C09</b>	Y7 - Y12	Improve Lesson planning and student engagement while saving time. <i>Bill Murray</i>
<b>C10</b>	Y7 - Y10	Powerful Conceptual Models <i>Claire Moriarty</i>
<b>C11</b>	Y7 - Y12	Connections through mathematical modelling <i>Ross Turner, Jim Spithill</i>
<b>C12</b>	Y7 - Y12	Conceptualise and understand Mathematics with Geometry <i>Sanjeev Meston</i>
<b>C13</b>	Y7 - Y10	Challenging, coherent, cumulative experiences that engage all students <i>Peter Sullivan</i>
<b>C14</b>	Y7 - Y12	The future of grades and the impact on growth mindset <i>Tamara Heaney</i>
<b>C15</b>	F - Y6	Using the e5 Instructional Model in Maths <i>Nichole Skews</i>
<b>C16</b>	Y5 - Y12	What's Inside an Escher Print? <i>Toen Castle, Christopher Lenard, Katherine Seaton</i>
<b>C17</b>	F - Y8	Mathematics Learning Difficulties <i>Nathalie Parry</i>
<b>C18</b>	Y3 - Y6	Number Talks in the Primary Classroom <i>Renee Patel, Lauren Lamont</i>
<b>C19</b>	Y7 - Y12	A Conversation about Out of Field Teaching <i>Michael O'Connor</i>
<b>C20</b>	Y9 - Y12	The Three P's of Performance <i>Dietmar Schaffner</i>
<b>C21</b>	F - Y6	Differentiation Through Engaging Games <i>Catherine Epstein, Mandi Mackey</i>

<b>C22</b>		<i>Cancelled</i>
<b>C23</b>	Y11 - Y12	Open-ended Tasks in Maths Methods <i>Trang Pham</i>
<b>C24</b>	Y7 - Y10	Maths and Music – play me a tune on your calculator <i>Brian Lannen</i>
<b>C25</b>	Y5 - Y12	The Art of Mathematics <i>John Bament</i>
<b>C26</b>	Y5 - Y6	Differentiating Explorations with Manipulatives and Technology. <i>Amy Somers, Leonie Hagggett</i>
<b>C27</b>	Y11 - Y12	Mathematical Methods Unit 3: Introducing Discrete Random Variables <i>Peter Flynn</i>
<b>C28</b>	F - Y6	Using Data To Inform Your Teaching <i>Andrew Spitty</i>
<b>C29</b>	Y11 - Y12	Further Mathematics Exam - featuring efficient ClassPad use <i>Elena Zema</i>
<b>C30</b>	Y7 - Y12	Producing brilliant mathematical diagrams <i>Geoff Phillips, Ann Phillips</i>
<b>C31</b>	Y2 - Y8	Learning Fractions With Picture Puzzles <i>Douglas Williams</i>
<b>C32</b>	Y7 - Y10	Small Shifts, Big Gains <i>Deb Carmichael, Karen Milkins-Hendry</i>
<b>C33</b>	Y11 - Y12	CAS in Specialist Mathematics Classroom <i>Bozenna Graham</i>
<b>C34</b>	Y11 - Y12	Build your own ClassPad functions and programs <i>Charlie Watson</i>
<b>C35</b>	Y7 - Y10	Digital diagnostic assessment - be smart about planning <i>Vanessa Rule-Paddle, Lindy Sharkey</i>
<b>C36</b>	F - Y10	MAWA Competitions & Resources for Reciprocal Members <i>John West</i>
<b>C37</b>	Y11 - Y12	Nailing the 2018 Methods Exam 2 with a ClassPad <i>Alastair Lupton</i>
<b>C38</b>	Y4 - Y10	MathsCraft – working like a mathematician! <i>Jacqui Lee, Anita Ponsaing</i>

# SESSION SUMMARY: THURSDAY (cont.)

<b>C39</b>	Y11 - Y12	Using Mathematica as an Effective Tool <i>Brian Stokes</i>
<b>C40</b>	F - Y6	Differentiating learning through Success Criteria <i>Paul Staniscia</i>

## SESSION D: 2.30PM-3.30PM

<b>D01</b>	Y5 - Y10	Multiplication: A sign of the times <i>Stephen Hanlon</i>
<b>D02</b>	Y5 - Y12	I don't understand the question - EAL <i>Sean Kelleher, Sharon Lei</i>
<b>D03</b>	F - Y4	More blocks and less blocking <i>Cassandra Lowry</i>
<b>D04</b>	Y5 - Y6	Effective Team Teaching in a Mathematics Classroom <i>Eadaoin Lorigan, Tanya Tanner</i>
<b>D05</b>	F - Y6	Top Tips to Accelerate Learning <i>Ian Stevens</i>
<b>D06</b>	F - Y8	Fun fractions with Cuisenaire rods <i>Bernadette Mercieca</i>
<b>D07</b>	F - Y6	Enhancing student voice through problem solving and inquiry <i>Nadia Walker</i>
<b>D08</b>	Y7 - Y10	Using Education Perfect to make connections in Maths <i>Jess Mikecz</i>
<b>D09</b>	F - Y6	Challenging Maths tasks to promote student agency. <i>Stacey Lamb</i>
<b>D10</b>	Y3 - Y10	The Pedagogy of Picture Puzzles <i>Douglas Williams</i>
<b>D11</b>	Y11 - Y12	Recipe to develop VCE Mathematics SAC 101 <i>Echo Gu, Trevor Smith</i>
<b>D12</b>	F - Y6	Challenging, coherent, cumulative experiences that engage all students <i>Peter Sullivan</i>
<b>D13</b>	F - Y8	From additive to multiplicative thinking: Ideas for teaching <i>Mayamiko Malola, Catherine Pearn, Max Stephens</i>

<b>D14</b>	Y5 - Y10	The Questioning Classroom <i>Mike Clapper</i>
<b>D15</b>	Y5 - Y12	Curriculum that can connect every student <i>Steven Goldberg, Madeleine Graham</i>
<b>D16</b>	Y5 - Y10	Communicating sustainability using student-led statistical investigations <i>Vaughan Barras, Michael Llewellyn</i>
<b>D17</b>	Y11 - Y12	Academic integrity for maths tasks <i>Katherine Seaton</i>
<b>D18</b>	Y9 - Y10	Motivating and Engaging Middle Secondary Learners <i>Megan Steel, Jessica Carter</i>
<b>D19</b>	F - Y10	Victorian Curriculum Assessment and Curriculum Made Easy <i>Andrew Spitty</i>
<b>D20</b>	Y5 - Y10	What makes a mathematical task rich? <i>Michaela Epstein</i>
<b>D21</b>	Y11 - Y12	Further Mathematics Exam - featuring efficient ClassPad use <i>Elena Zema</i>
<b>D22</b>	F - Y8	Linking explicit teaching to meta-cognition. <i>Michael Younger, Laura Boylan, Amanda Williams</i>
<b>D23</b>	F - Y6	Place Value: Developing quality assessment items <i>Angela Rogers</i>
<b>D24</b>	Y5 - Y10	From sharing to ratios: It's all about proportions. <i>Helen Booth, Leanne McMahon</i>
<b>D25</b>	Y11 - Y12	Edrolo for Mathematics: Data, Differentiation and Exam Preparation <i>Liam Ferris, Mark Drummond</i>
<b>D26</b>	F - Y10	Algebra Tiles - A Lesson in the Unknown <i>Nadia Abdelal, Anna Bock</i>
<b>D27</b>	Y5 - Y12	The Data Driven Teacher <i>Craig Blake</i>
<b>D28</b>	Y5 - Y10	Keeping it real - Data, data and more data <i>John Widmer, Juan Ospina León</i>
<b>D29</b>	Y5 - Y8	Using Problem Solving to Create Differentiated Learning Experiences <i>Pauline Kohlhoff, Anne Prescott</i>
<b>D30</b>	F - Y6	Creating mathematical engagement with Maths300 <i>Stephen McLeod, Laura O'Meara</i>



<b>D31</b>	Y11 - Y12	Mathematical Methods: Probability enhanced with TI-Nspire <i>Frank Moya</i>
<b>D32</b>	Y11 - Y12	Developing Further Mathematics SAC tasks <i>Kevin McMenamin</i>
<b>D33</b>	F - Y10	Parental Perceptions of NAPLAN: Who's Telling the Truth? <i>Linda Cranley, Gregory Hine</i>
<b>D34</b>	Y11 - Y12	Tips/resources for First Year VCE Mathematical Methods (Units 1 & 2) Teachers <i>Ian Wong</i>
<b>D35</b>	Y5 - Y8	Making Connections: Making maths planning easier <i>Jacinta Blencowe</i>
<b>D36</b>	Y9 - Y10	Chance, Data and the Gambling Issue <i>Robert Money</i>
<b>D37</b>	Y9 - Y12	Lights, Music and the TI-Innovator <i>Raymond Rozen, Shane Dempsey</i>
<b>D38</b>	Y9 - Y12	Wowed by Widgets – The Directors Cut <i>Chris Ireson, Len Bedier</i>
<b>D39</b>	Y7 - Y10	Sparking interest and engagement in the secondary classroom <i>Vanessa Rule-Paddle, Tim Carruthers</i>
<b>D40</b>	Y7 - Y12	Improve Lesson planning and student engagement while saving time. <i>Bill Murray</i>

### SESSION D-E: 2.30PM-4.40PM

<b>D-E01</b>	F - Y6	Embedding Active Pedagogy into Teacher Education targeting Mathematics: Transform-Ed! <i>Paul Dann</i>
<b>D-E02</b>	Y7 - Y10	Making Probability accessible for all students <i>Narcisa Corcaci</i>
<b>D-E03</b>	F - Y6	Masterclass: Supporting leaders in their first years of leading <i>Ellen Corovic, Aimee Fleming</i>
<b>D-E04</b>	Y7 - Y12	Masterclass: Supporting leaders in their first years of leading (a secondary focus) <i>Helen Haralambous, Danijela Draskovic</i>
<b>D-E05</b>	Y7 - Y12	Avoiding the RHS <i>Peter Fox</i>

<b>D-E06</b>	Y5 - Y10	Critical connections between language, literacy, mathematics and numeracy <i>Dave Tout</i>
<b>D-E07</b>	Y7 - Y12	Formative Assessment with Mobile Devices in Mathematics Classroom <i>Irina Lyublinskaya</i>

### SESSION E: 3.40PM-4.40PM

<b>E01</b>	F - Y10	Reflection and Metacognition in The Mathematics Classroom <i>Genovieve Groupios</i>
<b>E02</b>	Y9 - Y12	Worthwhile CAS calculator use in this year's Mathematical Methods Exam 2 <i>Kevin McMenamin</i>
<b>E03</b>	F - Y8	Addressing misconceptions about mass and volume/capacity <i>Heather McMaster</i>
<b>E04</b>	Y7 - Y12	Producing brilliant mathematical diagrams <i>Geoff Phillips, Ann Phillips</i>
<b>E05</b>	Y11 - Y12	Mathematical Investigations for the new VCE Structure <i>Brian Lannen</i>
<b>E06</b>	Y9 - Y12	When is a square a triangle? <i>Chris Wetherell</i>
<b>E07</b>	Y11 - Y12	Interesting Physics Applications for Methods & Specialist SACs <i>Wayne Semmens</i>
<b>E08</b>	Y9 - Y12	Preparing students for external exams, what's QLD doing? <i>Antje Leigh-Lancaster, Julian Lumb</i>
<b>E09</b>	Y7 - Y10	Team Teaching & Student Advocacy <i>Simon Pitaro, Natalie Raspudic</i>
<b>E10</b>	F - Y4	Developing Number Sense P-2 <i>Kerri Smith</i>
<b>E11</b>	Y11 - Y12	Demonstrating tricky concepts in VCE Maths using Desmos <i>Bryn Humberstone</i>
<b>E12</b>	Y7 - Y12	Making Mathematical Memories - The big ideas behind teaching <i>Zoe Schaffner, Aline MacDonald</i>
<b>E13</b>	F - Y12	Student-Centred Coaching in Mathematics <i>Kate Lachmund, Daniel Nadjidai</i>

# SESSION SUMMARY: THURSDAY (cont.)

<b>E14</b>	Y5 - Y10	Rock N Rover <i>Jody Crothers</i>
<b>E15</b>	Y9 - Y12	Function Junction – Exploring functions, graphing and coordinate geometry <i>Roger Wander</i>
<b>E16</b>	Y9 - Y12	Big Mathematical Ideas from Computing <i>Kaye Stacey</i>
<b>E17</b>	Y11 - Y12	Mathematics and Mathematical Literacy solution strategies; Teachers comments <i>France Machaba</i>
<b>E18</b>	F - Y6	Balancing Being Open, Challenging and Explicit <i>Michael Bairstow</i>
<b>E19</b>	Y9 - Y10	Flipped learning - a mathematics experience for Year 9 boys <i>Penelope Kalogeropoulos, Angela Liyanage</i>
<b>E20</b>	F - Y8	Exploring students' mathematical reasoning through horizon problems <i>Dianne Siemon</i>
<b>E21</b>	Y7 - Y12	Mathematical Ideas in the Game of SET <i>Amie Albrecht</i>
<b>E22</b>	Y5 - Y8	Really different Number and Geometry Activities ... yes really!! <i>Ian Bull</i>
<b>E23</b>	Y7 - Y12	La Trobe Bendigo's new maths enhancement program <i>Michael Payne, Toen Castle</i>
<b>E24</b>	Y5 - Y6	Rich Tasks that Challenge our Learners to Think <i>Catherine Epstein, Martin Holt</i>
<b>E25</b>	Y5 - Y12	Using teacher feedback to shape product direction <i>Andrew Crisp</i>
<b>E26</b>	Y11 - Y12	Complex Numbers, Polynomial Equations and Polygons Yew <i>Fook Chan</i>
<b>E27</b>	Y7 - Y12	Enhance Your Teaching with OneNote <i>Ashley Carlton, Scott Allder</i>
<b>E28</b>	Y7 - Y12	Journaling in Mathematics education <i>Peter Breukers</i>

<b>E29</b>	Y9 - Y12	Real trigonometry with real time, real world data <i>Enzo Vozzo</i>
<b>E30</b>	F - Y6	Top Tips to Accelerate Learning <i>Ian Stevens</i>
<b>E31</b>	F - Y6	Kids - hate to estimate <i>Jennifer Bowden</i>
<b>E32</b>	Y7 - Y10	Small Shifts, Big Gains <i>Deb Carmichael, Karen Milkins-Hendry</i>
<b>E33</b>	Y11 - Y12	Mathematical Methods: Probability enhanced with TI-Nspire <i>Frank Moya</i>
<b>E34</b>	Y4 - Y10	Learning Algebra With Picture Puzzles <i>Douglas Williams</i>
<b>E35</b>	Y5 - Y10	Teaching with Algebra Tiles <i>Michael O'Reilly, Norrian Rundle</i>
<b>E36</b>	Y9 - Y12	Lights, Music and the TI-Innovator <i>Raymond Rozen, Shane Dempsey</i>
<b>E37</b>	Y11 - Y12	Investigating Complex Numbers Using Series <i>Ray Williams, Katie Bye</i>
<b>E38</b>	Y9 - Y12	Bringing VCE Maths to Life with TI-Nspire <i>Stephen Crouch</i>
<b>E39</b>	Y5 - Y12	Wolfram Language coding introduction, challenging tasks, formative assessment <i>Ian Willson</i>
<b>E40</b>	Y11 - Y12	Using Computers in a Maths Classroom with Year 11/12+ Students <i>Robert Rook</i>
<b>E41</b>	Y5 - Y8	Calendars, clocks and sundials <i>Tim Byrne</i>

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## HEADS OR TAILS

1-6

When Maggie can't decide what to do, she flips a coin - but not all the results come out in Maggie's favour. What will Maggie do when she has a really important decision to make?

Can you guess what happens next?

\$16 (MEMBER)  
\$20 (NON MEMBER)

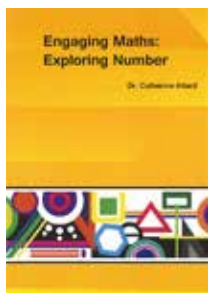


## BEEP BEEP VROOM VROOM

K-2

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

\$12.68 (MEMBER)  
\$15.85 (NON MEMBER)



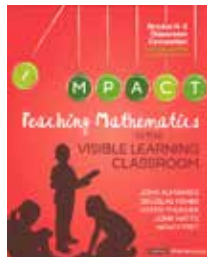
## ENGAGING MATHS: EXPLORING NUMBER

F-6

This book presents a collection of 10 rich activities that address aspects of the Number and Algebra strand of the Australian Curriculum: Mathematics. More importantly, the activities are underpinned by the processes of mathematics described in the proficiency strands of the curriculum. Each of the activities is supported by detailed ideas for implementation, reflection, assessment, differentiation and curriculum links.

The book enhances the teaching of mathematics rather than focusing purely on learning. By using it as a professional learning tool, not only will your teaching be enhanced, your students' learning and engagement will also benefit. The book includes resource lists, curriculum links, implementation ideas, reflection starters, ideas for differentiation and black line masters for students.

\$29.70 (MEMBER)  
\$37.13 (NON MEMBER)



## TEACHING MATHEMATICS IN THE VISIBLE LEARNING CLASSROOM

K-2

Select the right task, at the right time, for the right phase of learning. How can you best help K-2 students to become assessment-capable visible learners in mathematics? This book answers that question by showing Visible Learning strategies in action in high-impact mathematics instruction. Walk in the shoes of K-2 teachers as they mix and match strategies, tasks, and assessments, demonstrating that it's not only what works, but when. A decision-making matrix and grade-level examples help you leverage the most effective teaching practices at the most effective time to meet the surface, deep, and transfer learning needs of every young student.

\$45.08 (MEMBER)  
\$56.35 (NON MEMBER)

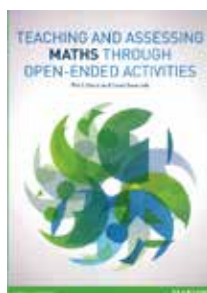


## COMBO CARD GAME (INDIVIDUAL PACK)

5-8

COMBO is featured in Dr Paul Swan's book *Cards on the Table*. The game is designed to help students practice their basic number facts. An ideal game for children in upper primary and lower secondary school.

\$3.15 (MEMBER)  
\$3.94 (NON MEMBER)



## TEACHING AND ASSESSING MATHS THROUGH OPEN-ENDED ACTIVITIES

F-6

This book contains activities and real student work samples as a guide, to help improve student learning. It relates mathematical strategies to real life situations for students and caters for different needs, allowing for differentiated learning. Designed for teachers to help students practise investigation, conduct assessment and create reports.

\$53 (MEMBER)  
\$66.25 (NON MEMBER)

# SESSION SUMMARY: FRIDAY

FRIDAY 6 DECEMBER 2019

## SESSION F: KEYNOTE, 9AM-10AM

<b>F01</b>	F - Y8	Big ideas: connecting within and across the mathematics curriculum <i>Mike Askew</i>
<b>F02</b>	F - Y4	Challenge and enjoyment: Getting the right balance in primary mathematics classrooms <i>Janette Bobis</i>
<b>F03</b>	Y7 - Y12	A story of change: Transforming how mathematics is taught <i>Cassandra Marinopoulos</i>
<b>F04</b>	F - Y12	Mathematics teaching, learning, assessment and reporting: Time to join the dots <i>Hilary Hollingsworth</i>
<b>F05</b>	Y7 - Y12	Intuition and Cognitive Conflict: From “Oh-Oh” to “Ah-Ha” <i>Greg Oates</i>

For a full description of keynotes, see page 5.

## SESSION G: 11AM-12PM

<b>G01</b>	F - Y6	Warm Ups: More Than Just Tuning In <i>Marissa Cashmore, Laura MacLean</i>
<b>G02</b>	F - Y4	Proficiencies - The ‘Action’ of Mathematics <i>Judy Gregg, Genovieve Grouios</i>
<b>G04</b>	F - Y6	Approaches to support planning for student-centred learning in mathematics. <i>Aylie Davidson</i>
<b>G05</b>	F - Y6	A university-school partnership model for strengthening mathematics education <i>Wendy Goff</i>
<b>G06</b>	F - Y8	Teaching Fractions Developmentally <i>Bruce Williams, Natalie Gugger</i>
<b>G07</b>	F - Y10	VCAA Mathematics Annotated Work Samples <i>Crystal Afitu, David Leigh-Lancaster</i>

<b>G08</b>	Y7 - Y12	Using manipulatives in the High School classroom <i>Vicky Kennard</i>
<b>G09</b>	Y7 - Y12	Excel enhances the teaching and learning mathematics <i>Karim Noura</i>
<b>G10</b>	Y9 - Y12	What’s New with CX II? Exploring TI-Nspire <i>Peter Fox</i>
<b>G11</b>	Y7 - Y10	Connecting Probability <i>Heather Ernst, Anna Morton</i>
<b>G12</b>	Y9 - Y12	Wowed by Widgets – The Directors Cut <i>Chris Ireson, Len Bedier</i>
<b>G13</b>	Y11 - Y12	Recipe to develop VCE Mathematics SAC 101 <i>Echo Gu, Trevor Smith</i>
<b>G14</b>	F - Y6	Moving Maths Intervention into the Whole Class Setting <i>John Hein, Rebecca Forder, Rebecca Kerr</i>
<b>G15</b>	Y5 - Y10	The Questioning Classroom <i>Mike Clapper</i>
<b>G16</b>	Y5 - Y12	Curriculum that can connect every student <i>Steven Goldberg, Madeleine Graham</i>
<b>G17</b>	Y11 - Y12	Constructing a Further Mathematics Application SAC <i>Robyn Crockett</i>
<b>G18</b>	F - Y6	Problem Solving and PLT’s <i>Sara McKee, Melissa Lake</i>
<b>G19</b>	F - Y6	Helping Students Know How to be a Mathematician <i>Sue Gardiner</i>
<b>G20</b>	Y7 - Y10	Team Teaching & Student Advocacy <i>Simon Pitaro, Natalie Raspudic</i>
<b>G21</b>	Y7 - Y10	Adusu Algebra Concrete Materials assisting understanding <i>Ruth Adusu</i>
<b>G22</b>	F - Y6	Shaping’ Our Geometry Curriculum <i>Mark Gleeson</i>
<b>G23</b>	Y5 - Y12	How to teach Secondary Mathematics <i>Peter Collins</i>

<b>G24</b>	Y7 - Y10	Desmos Classroom Activities for Formative Assessment <i>Bryn Humberstone</i>
<b>G25</b>	F - Y12	How can engagement with online communities support my maths teaching? <i>Michaela Epstein, Oliver Lovell, Amie Albrecht</i>
<b>G26</b>	F - Y10	Concept Cartoons- The Best Idea You've Never Heard Of <i>Michael Minas, Jess Greenbaum</i>
<b>G27</b>	F - Y6	Whole School Curriculum Design Around the Big Ideas <i>Jen Briggs, Jade Seddon</i>
<b>G28</b>	F - Y4	Mathematical Language.. Please Explain! <i>Belinda Atkin, Penelope Townley, David Sukh</i>
<b>G29</b>	Y7 - Y10	Using Data To Inform Your Teaching <i>Andrew Spitty</i>
<b>G30</b>	Y7 - Y8	Scaffolding Mathematical Reasoning for Junior Secondary <i>Carolyn Smales, Joel Townsend</i>
<b>G31</b>	F - Y2	Algebra for All even 6 year olds <i>Courtney Chalmers, Sarah Finnegan</i>
<b>G32</b>	Y5 - Y8	Algebra Through Geometry <i>Douglas Williams</i>
<b>G33</b>	Y9 - Y12	Worthwhile CAS calculator use in this year's Mathematical Methods Exam 2 <i>Kevin McMenamin</i>
<b>G34</b>	Y7 - Y10	Sparking interest and engagement in the secondary classroom <i>Vanessa Rule-Paddle, Tim Carruthers</i>
<b>G35</b>	Y9 - Y12	Bringing VCE Maths to Life with TI-Nspire <i>Stephen Crouch</i>
<b>G36</b>	Y11 - Y12	Investigating Complex Numbers Using Series <i>Ray Williams, Katie Bye</i>
<b>G37</b>	Y5 - Y12	Wolfram Language coding introduction, challenging tasks, formative assessment <i>Ian Willson</i>
<b>G38</b>	Y7 - Y12	Rover Will Find the Solution <i>Rodney Anderson, Jim Lowe</i>
<b>G39</b>	F - Y8	Maths lessons: off to a cracking start! <i>Rob Vingerhoets</i>

### SESSION G-H: 11AM-1.20PM

<b>G-H01</b>	F - Y2	Developing early maths concepts through play <i>Leah O'Neill</i>
<b>G-H02</b>	Y11 - 12	Taking conceptual understanding to the next level in Mathematical Methods <i>Sanjeev Meston</i>
<b>G-H03</b>	Y11 - Y12	Constructing statistical application tasks in Further Mathematics <i>Peter Jones</i>
<b>G-H04</b>	F - Y6	Masterclass: Thrive and survive: The first five years of primary school teaching! <i>Jennifer Bowden, Ellen Rennie</i>
<b>G-H05</b>	Y7 - Y12	Formative Assessment with Mobile Devices in Mathematics Classroom <i>Irina Lyublinskaya</i>
<b>G-H06</b>	F - Y6	Learning mathematics through a spirit of inquiry <i>Lee-Anne Pyke, Ellen Corovic</i>

### SESSION H: 12.10PM-1.10PM

<b>H01</b>	Y3 - Y8	Bringing Maths Learning to Life <i>Dan Steele, Dianne Liddell</i>
<b>H02</b>	Y11 - Y12	Nailing the 2018 Methods Exam 2 with a ClassPad <i>Alastair Lupton</i>
<b>H03</b>	F - Y6	Making Maths Engaging for Students AND Teachers! <i>Bernard Kerrins</i>
<b>H04</b>	Y9 - Y12	Further Maths Exams: using the CAS calculator efficiently and effectively <i>Kevin McMenamin</i>
<b>H05</b>	Y7 - Y10	Using Education Perfect to make connections in Maths <i>Jess Mikecz</i>
<b>H06</b>	Y11 - Y12	Making connections through games in VCE Maths <i>Rosalind Willsher, Emily DiBella</i>
<b>H07</b>	Y11 - Y12	Interesting Physics Applications for Methods & Specialist SACs <i>Wayne Semmens</i>



# SESSION SUMMARY: FRIDAY (cont.)

<b>H08</b>	Y7 - Y10	Kicking goals with Year 9 Data & AFL Fantasy <i>Anthea Wood, Lachlan Short</i>
<b>H09</b>	F - Y6	Helping Students Know How to be a Mathematician <i>Sue Gardiner</i>
<b>H10</b>	Y11 - Y12	Using Computers in a Maths Classroom with Year 11/12+ Students <i>Robert Rook</i>
<b>H11</b>	F - Y10	Concept Cartoons- The Best Idea You've Never Heard Of <i>Michael Minas, Jess Greenbaum</i>
<b>H12</b>	Y5 - Y12	Making Music with Maths <i>John Bament</i>
<b>H13</b>	F - Y8	Mathematics Learning Difficulties <i>Nathalie Parry</i>
<b>H14</b>	Y3 - Y6	Number Talks in the Primary Classroom <i>Renee Patel, Lauren Lamont</i>
<b>H15</b>	Y5 - Y12	From Print to Digital: What can a free maths textbook offer? <i>Craig Blake</i>
<b>H16</b>	F - Y6	Inquiry-Driven Maths Planning: Using themes to link curriculum <i>Tim Teague, Stan Grazotis</i>
<b>H17</b>	Y7 - Y12	Finding gaps in student learning! Are you struggling to engage middle school students in the maths classroom? <i>Adam Kruger</i>
<b>H18</b>	Y5 - Y10	From sharing to ratios: It's all about proportions. <i>Helen Booth, Leanne McMahon</i>
<b>H19</b>	Y11 - Y12	Edrolo for Mathematics: Data, Differentiation and Exam Preparation <i>Liam Ferris, Mark Drummond</i>
<b>H20</b>	F - Y10	Algebra Tiles - A Lesson in the Unknown <i>Nadia Abdelal, Anna Bock</i>
<b>H21</b>	Y5 - Y8	Using a deeper understanding of angle to overcome confusion with protractors: a MATHOMAT workshop <i>John Lawton</i>
<b>H22</b>	Y5 - Y10	Keeping it real - Data, data and more data <i>John Widmer, Juan Ospina León</i>

<b>H23</b>	Y5 - Y8	Using Problem Solving to Create Differentiated Learning Experiences <i>Pauline Kohlhoff, Anne Prescott</i>
<b>H24</b>	F - Y6	Creating mathematical engagement with Maths300 <i>Stephen McLeod, Laura O'Meara</i>
<b>H25</b>	Y5 - Y10	Targeted Teaching through a Learning Progression in Geometric Reasoning <i>Marj Horne</i>
<b>H26</b>	Y7 - Y12	I'm a Maths Head of Department. What should I do? <i>Andrew Kerr, Caitlyn Leversha</i>
<b>H27</b>	Y5 - Y10	Cartesian Coordinates Come to Life <i>Jody Crothers</i>
<b>H28</b>	Y3 - Y6	Movies through a mathematical lens <i>Toby Russo, James Russo</i>
<b>H29</b>	Y5 - Y8	Creating links between Maths and Science <i>Rochelle Dickson, Dahliyani Briedis</i>
<b>H30</b>	Y7 - Y12	AI - Machine Learning and Algorithmics <i>Craig Bauling</i>
<b>H31</b>	Y1 - Y6	Crib Points <i>Douglas Williams</i>
<b>H32</b>	Y5 - Y8	How to Teach Decimals Better <i>Michael O'Reilly, Norrian Rundle</i>
<b>H33</b>	F - Y4	Using Choral Counting to Promote Reasoning <i>Amy Somers and Tahlia Bowden</i>
<b>H34</b>	Y5 - Y12	How to teach Secondary Mathematics <i>Peter Collins</i>
<b>H35</b>	Y11 - Y12	ClassPad Tips and Tricks <i>Charlie Watson</i>



## SESSION I: 2.30PM-3.30PM

<b>I01</b>	Y5 - Y10	Multiplication: A sign of the times <i>Stephen Hanlon</i>
<b>I02</b>	Y5 - Y12	I don't understand the question - EAL <i>Sean Kelleher, Sharon Lei</i>
<b>I03</b>	Y7 - Y10	Free resources for delivering excellence in financial literacy <i>Damian Nicholson</i>
<b>I04</b>	F - Y10	Footy Maths- engaging learners <i>Richard Korbosky</i>
<b>I05</b>	Y7 - Y10	Making Connections <i>Mike Clapper</i>
<b>I06</b>	Y7 - Y10	Kicking goals with Year 9 Data & AFL Fantasy <i>Anthea Wood, Lachlan Short</i>
<b>I07</b>	F - Y10	Victorian Curriculum Assessment and Curriculum Made Easy <b>Andrew Spitty</b>
<b>I08</b>	Y9 - Y12	Function Junction – Exploring functions, graphing and coordinate geometry <i>Roger Wander</i>
<b>I09</b>	Y5 - Y10	Inquisitive, Inspiring Warm Ups <i>Helen Haralambous</i>
<b>I10</b>	F - Y6	Embedding Reasoning opportunities in lesson structure <i>Greg Eddy</i>
<b>I11</b>	Y9 - Y12	Big Mathematical Ideas from Computing <i>Kaye Stacey</i>
<b>I12</b>	Y11 - Y12	Euler's Vision: Mathematics through drama <i>Tom Petsinis</i>
<b>I13</b>	Y9 - Y12	Geometry + Technology = Proof <i>Irina Lyublinskaya</i>
<b>I14</b>	F - Y8	Exploring students' mathematical reasoning through horizon problems <i>Dianne Siemon</i>
<b>I15</b>	Y5 - Y8	Creating links between Maths and Science <i>Rochelle Dickson, Dahliyani Briedis</i>
<b>I16</b>	Y5 - Y12	Using teacher feedback to shape product direction <i>Andrew Crisp</i>
<b>I17</b>	Y5 - Y12	What is the role of digital in building conceptual understanding? <i>Tamara Heaney</i>

<b>I18</b>	Y11 - Y12	Tackling issues faced in VCE Mathematics classrooms <i>Evan Curnow, Stephen Crouch, Peter Karakoussis and Oliver Lovell</i>
<b>I19</b>	Y7 - Y12	Journaling in Mathematics education <i>Peter Breukers</i>
<b>I20</b>	Y9 - Y12	Real trigonometry with real time, real world data <i>Enzo Vozzo</i>
<b>I21</b>	F - Y6	Using the Context of the Olympic Games to enhance the learning of Mathematics <i>Pam Hammond</i>
<b>I22</b>	Y2 - Y7	Luke's Fraction Game & a Practical Fraction Unit <i>Douglas Williams</i>
<b>I23</b>	Y7 - Y12	Connections through mathematical modelling <i>Ross Turner, Jim Spithill</i>
<b>I24</b>	Y7 - Y12	Further More Mathemagical Marvels to liven up lessons <i>Andrew Wrigley, Wally Brodar</i>
<b>I25</b>	Y11 - Y12	Widgets and UDFs in the classroom using TI-Nspire <i>James Mott</i>
<b>I26</b>		<i>Moved to J03</i>
<b>I27</b>	Y7 - Y10	Digital diagnostic assessment - be smart about planning <i>Vanessa Rule-Paddle, Lindy Sharkey</i>
<b>I28</b>	Y5 - Y8	Making Connections: Making maths planning easier <i>Jacinta Blencowe</i>
<b>I29</b>	Y6 - Y7	Are your students ready for Year 7 Maths? <i>Wendy Taylor</i>
<b>I30</b>	F - Y6	Differentiation in the primary classroom: Problem-solving prompts <i>James Russo, Michael Minas</i>
<b>I31</b>	Y7 - Y12	BYOD – Is it worth it? <i>Ro Bairstow</i>
<b>I32</b>	F - Y2	Algebra for All even 6 year olds <i>Courtney Chalmers, Sarah Finnegan</i>
<b>I33</b>	Y7 - Y8	Scaffolding Mathematical Reasoning for Junior Secondary <i>Carolyn Smales, Joel Townsend</i>

# SESSION SUMMARY: FRIDAY (cont.)

## SESSION I-J: 2.30PM-4.40PM

<b>I-J01</b>	Y5 - Y10	Algorithmic Thinking in the Classroom: What, Why, How? <i>Sebastian Sardina, Max Stephens</i>
<b>I-J02</b>	Y7 - Y12	The beginning secondary mathematics teacher <i>Rob Vermay</i>
<b>I-J03</b>	Y7 - Y12	A day in the life of a Mathspace teacher and student <i>Craig Blake</i>

## SESSION J: 3.40PM-4.40PM

<b>J01</b>	Y4 - Y10	Connecting Mathematics through Rectangles & Squares <i>Douglas Williams</i>
<b>J02</b>	Y5 - Y10	My Students Don't Know Their Tables! <i>Michael O'Reilly, Norrian Rundle</i>
<b>J03</b>	Y11 - Y12	Creating Widgets for Senior Mathematics <i>Neale Woods</i>
<b>J04</b>	Y11 - Y12	Developing Further Mathematics SAC tasks <i>Kevin McMenamin</i>
<b>J05</b>	Y7 - Y12	Getting the Most From FX Draw <i>Paul Hooper</i>
<b>J06</b>	Y9 - Y10	Chance, Data and the Gambling Issue <i>Robert Money</i>
<b>J07</b>	F - Y10	MAWA Competitions & Resources for Reciprocal Members <i>John West</i>
<b>J08</b>	Y11 - Y12	Investigating Integer Square Roots of Complex Numbers <i>Ray Williams, Katie Bye</i>
<b>J09</b>	Y7 - Y12	Valuing student work in mathematics at Camberwell High School <i>Geoffrey Menon, Ursula Parker</i>
<b>J10</b>	Y4 - Y10	MathsCraft - working like a mathematician! <i>Jacqui Lee, Anita Ponsaing</i>
<b>J11</b>	Y9 - Y12	Tips for using TI Nspire CAS effectively in Further Mathematics <i>Danijela Draskovic</i>

<b>J12</b>	Y5 - Y10	More Maths games to engage students <i>Helen Haralambous</i>
<b>J13</b>	Y7 - Y10	Using Computers in a Maths Classroom with Year 7-10 Students' Years: 7 to 10 <i>Robert Rook</i>
<b>J14</b>	F - Y6	Enhancing student voice through problem solving and inquiry <i>Nadia Walker</i>
<b>J15</b>	Y5 - Y10	Mathematical Modelling in the Middle Years <i>Bernadette Mercieca</i>
<b>J16</b>	F - Y6	Using the e5 Instructional Model in Maths <i>Nichole Skews</i>
<b>J17</b>	F - Y4	An alternative approach to introduce the equal sign <i>Jiqing Sun</i>
<b>J18</b>	F - Y4	Making Connections in Early Years Through Games <i>Amy Somers and Nikki Barker</i>
<b>J19</b>	Y7 - Y10	Coding in the Maths Classroom <i>Georgia Gouros</i>
<b>J20</b>	Y7 - Y10	Aduku Algebra Concrete Materials assisting understanding <i>Ruth Aduku</i>
<b>J21</b>	F - Y6	Using the Context of the Olympic Games to enhance the learning of Mathematics <i>Pam Hammond</i>
<b>J22</b>	F - Y4	Developing Number Sense P-2 <i>Kerri Smith</i>
<b>J23</b>	F - Y10	Brain Training Maths Card Games <i>Richard Korbosky</i>



**SESSION  
DETAILS  
THURSDAY  
5 DECEMBER  
2019**

# SESSION A, Keynote, Thursday, 9am-10am

## A01 Reasoning as a mathematical habit of mind

**F - Y8, Curriculum/Assessment , Lecturer, Keynote**  
**Mike Askew AO, University of Witwatersrand, Johannesburg**

Of the four proficiencies – understanding, fluency, problem solving and reasoning – reasoning is often seen, I think, as the ‘gold standard’ of mathematics: harder to learn than the other fluencies and only accessible to a minority of learners. An alternative view – one that I share – is that mathematical reasoning is actually an extension of the sort of everyday reasoning that we all engage in throughout our lives. From that perspective, engaging in mathematical reasoning should be accessible to all learners and not just the select few. Contrary to another popular belief, reasoning is not necessarily dependent on fluency needing to be taught first. So rather than treat reasoning as something special and difficult in mathematics teaching, what would it look like to have it happening ‘little and often’ in all mathematics teaching, so that all pupils come to develop reasoning as a ‘habit of mind’? In this plenary I will share some of the research into how we can support everyone to reason mathematically and suggest some practical examples for bringing reasoning into the centre of mathematics and teaching and learning of numeracy across the curriculum.

## A02 Learning from children

**F - Y2, Context for Learning, Lecturer, Keynote**  
**Jill Cheeseman, Monash University**

Learning and teaching mathematics fascinates me and I know that some of the important things I have learned have come from children. In this session, I will share some stories that are memorable to me to illustrate ways in which children’s ideas and actions have left indelible imprints on my thinking, inspired me to be a better teacher, and amazed me with their insights.

As a teaching profession, I think we share our practice through our narratives. Maybe in some cases the stories are apocryphal but those I will recount are real and come from classrooms. I will connect each story to a research project, a professional development initiative or a kind invitation to problem-solve with children.

The power of these stories is to highlight socio-cultural issues in mathematics education, equity and access issues, theoretical perspectives, and the personal qualities of young mathematicians. In particular, children have reminded me of the curiosity, creativity, persistence and knowledge that they can bring to the pursuit of mathematics. My reflections serve

as one example of the ways in which teachers, and teacher educators, learn with children. I hope that participation in this session will prompt teachers to consider their experiences and how they have been learning from children.

## A03 Connecting teaching to student readiness

**F - Y12, Curriculum/Assessment , Lecturer, Keynote**  
**Geoff Masters AO, Australian Council for Educational Research (ACER)**

In each year of school, the most advanced students in mathematics are at least five to six years ahead of the least advanced students, with some evidence that this gap widens across the years of school. This is an issue if teachers understand their role as the delivery of the same mathematics curriculum to all students in a year level. Many less advanced students lack the prerequisite knowledge to engage meaningfully and so fall further behind each year. Other, more advanced, students often are not challenged and extended to the levels of which they are capable. One approach to this issue has been to create different mathematics streams, but this risks labelling, locking students into particular streams, and setting ceilings on how far some students can progress. This keynote considers an alternative structure for the school mathematics curriculum – one that would see all students progress through a sequence of attainment levels not linked directly to year levels.

## A04 Mythbusting Mathematics

**Y7 - Y12, Context for Learning/STEM , Lecturer, Keynote**  
**Kate Smith-Miles, The University of Melbourne**

This talk tackles some of the many myths about mathematics that affect student perceptions, and equips teachers to respond with debunking examples. The foundational aspect of the school mathematics curriculum can make it difficult for students to see the relevance to the real world and their future. The role of mathematics in tackling many of societies greatest challenges will be discussed, and the reason that mathematics consistently ranks as the top job in an annual world survey of occupations will be explained. Finally, some classroom suggestions will be offered to help students see that – far from being a dusty old and irrelevant subject – new mathematics is being developed all the time in response to society’s needs.

## A05 What's up with secondary school mathematics, and how can we improve it?

**Y7 - Y12, Context for Learning/Pedagogical Content Knowledge/Curriculum/Assessment, Lecturer, Keynote**

**Kylie Slaney, MAV Board member and Carey Baptist Grammar School.**

**Sarah Buckley, The Australian Council for Educational Research (ACER).**

**Sebastian Sardina, RMIT University University**

**Peter Goss, Grattan Institute**

**Neil Carmona - Vickery, Monash Tech School**

We often hear that learning maths teaches reasoning, problem solving logical, and critical thinking skills. Students can develop a host of technical skills but if they lack the capacity to apply these skills to solving problems which are anything other than technical exercises, their knowledge is irrelevant. A critical skill in mathematics is being able to derive a mathematical formulation from a context. Yet we also know that many students leave school not having mastered essential numeracy skills.

What should the role of school mathematics education be in our emerging new world? And as such, what mathematical ideas should students be required to engage with? Why are topics like algorithmic thinking and coding relevant to secondary school mathematics?

Are we pushing kids too far by asking them to do maths until year 10? Are we doing enough to combat maths anxiety in the secondary school maths classroom? What are the factors leading to this anxiety, and are we doing enough to address them?

What if maths was elective from Year 9 like other subjects? Couldn't students get enough numeracy across the curriculum after year 10 that maths was not needed anyway? If maths was not compulsory teachers may need to improve their practice and work harder to recruit and retain students in maths subjects. Teachers could then focus on those who are interested in maths, leading to more students taking higher level mathematics than currently; do you agree?

Come along and explore these topics with our panel of experts from across the maths education sector.

# SESSION B, Thursday, 11am-12pm

## B01 2018 Specialist Mathematics Examinations

**Y11 - 12, Curriculum/Assessment, Lecture**  
**Allason McNamara, Trinity Grammar, Dean Lamson,**  
**Kardinia International College and Philip Swedosh,**  
**The King David School**

Allason, Philip and Dean will discuss common student errors in the 2018 Specialist Mathematics examinations. An analysis of the Multiple Choice section will be given; by-hand skills will be discussed and different approaches to answering the Extended Answer questions will be outlined. Bring the 2018 Specialist Mathematics VCAA Exams.

## B02 Warm Ups: More Than Just Tuning In

**F - Y6, Pedagogical Content Knowledge, Workshop,**  
**Repeat/Commercial**  
**Marissa Cashmore, Macclesfield Primary School and**  
**Laura MacLean, Banyan Fields Primary School**

This workshop will be all about choosing authentic rich warm up activities or games and connecting them to fundamental skills and strategies that need to continuously be revisited throughout the year.

We will show participants how to use questioning during warm ups to extend and promote meta-cognition as well as demonstrate some quick formative assessments.

During this workshop we will also establish ways to extend some of these warm up tasks into further investigations. Some references to Maths300 will be used.

## B03 Bringing Maths Learning to Life

**Y3 - Y8, Curriculum/Assessment, Workshop, Repeat/**  
**Commercial**  
**Dianne Liddell, Engage Empower Educate**

This presentation is focused on helping teachers develop rich learning units that engage students, provide real-world experiences of maths and deepen students' understandings of mathematical concepts, strategies and skills.

Through this workshop, participants will be provided with resources and materials to support them in developing engaging mathematical units and learning experiences from Year 5 to Year 8.

Key learnings from the last ten years, including what not to do and key considerations when implementing these units of learning, will also be shared with all participants to assist them in planning and developing future units.

During the workshop, participants will be provided with the opportunity to collaborate with others to develop potential learning units, identifying ideas, skills and learning/teaching considerations for maths learning units. Participants will receive access to all examples developed within the workshop.

Having access to a laptop/device to access Victorian Curriculum will be helpful. A phone/device with a camera is also recommended to be brought along. Textas and paper will be provide to assist the collaborative crating time during the session.

## B05 Embedding numeracy across the school: it's more than just mathematics

**F - Y8, Context for Learning, Workshop**  
**Lee-Anne Pyke, Consultant**

The common and agreed national goals for schooling in Australia states that 'the curriculum will include a strong focus on literacy and numeracy skills'. However, numeracy or being numerate no longer refers to basic number skills but rather the ability to use school learnt mathematical knowledge and skills confidently with the practical demands of everyday life. By embedding numeracy across the school curriculum teachers can support students' numeracy development. Additionally, the demands of the mathematics curriculum can be incorporated alongside subjects such as literacy, humanities, Science, PE and Health thereby covering a number of curriculum demands at once. In this workshop, teachers will explore tasks from across curriculum areas and discuss how they activate the development of numeracy.



## **B06 Differentiating learning through Success Criteria**

**F - Y6, Curriculum/Assessment, Workshop, Repeat**  
**Paul Staniscia, St Joseph's Primary School**

Mathematics classrooms need to be a place where all students can learn and be challenged. However, the difficult role teachers have is differentiating the learning so that all students can access the mathematics. When using Learning Intentions and Success Criteria teacher clarity is enhanced as learners understand what they are learning, why they learning it and how they know when they have learnt it. So when we differentiate the learning, to support all students, instead of differentiating the task would it be more clear to students if we differentiated what the success looked like? This would enable all learners to access the learning and then identify success where it best suits them. This workshop will explore practical ways teachers can differentiate success criteria so that all students can make progress in their learning.

## **B07 Approaches to support planning for student-centred learning in mathematics.**

**F - Y6, Curriculum/Assessment, Workshop, Repeat**  
**Aylie Davidson, Deakin University**

As teachers of mathematics, it is an expectation that we plan student-centred learning sequences and experiences. This includes developing 'big-picture' thinking and designing lessons that are challenging, engaging and meet the needs of diverse learners. However, the day-to-day realities of planning for student-centred learning can be difficult and time-consuming. In this workshop, Aylie will share research-based approaches that can support teachers overcome the complexities of student-centred mathematics planning and make high-quality planning decisions to enhance student engagement and learning in mathematics. Aylie will also offer a planning model that can support teams of teachers focus on the key aspects of student-centred mathematics learning. Please bring along sample math unit/lesson plans and/or yearly/term overviews to share.

## **B08 VCAA Mathematics Annotated Work Samples**

**F - Y10, Curriculum/Assessment, Workshop, Repeat**  
**Crystal Afitu and David Leigh-Lancaster, Victorian Curriculum and Assessment Authority (VCAA)**

The VCAA has developed a set of twelve annotated student work samples during 2019. This session will provide an overview of these resources, and look at how they could be used to support curriculum, pedagogy and assessment

in the Victorian Curriculum: Mathematics F - 10. We will also discuss how schools might use a similar approach to develop complementary school-based annotated student work samples. Participants should bring a laptop and have downloaded the VCAA Mathematics work samples.

## **B09 Coding in the Maths Classroom**

**Y7 - Y10, Tools and Technology, Workshop, Repeat**  
**Georgia Gouros, Virtual School Victoria**

Exploring student cognition in the Maths classroom. Can students develop a deeper understanding of Mathematical concepts through targeted coding activities in the classroom? This workshop will provide teachers with ideas about how to introduce the use of coding using block based SNAP <https://snap.berkeley.edu/>, and text base Python <https://www.python.org/> programming languages with Maths students to:

- find pi by approximation, using Archimedes method
- find primes using Eratosthenes sieve method
- generate permutations/combinations

These activities are designed to expose students to numerical methods that they can create or replicate to help their understanding of their application.

## **B10 Further More Mathematical Marvels to liven up lessons**

**Y7 - Y12, Context for Learning, Workshop, Repeat**  
**Andrew Wrigley and Wally Brodar, Somerset College**

Building on Mathematical Marvels and More Mathematical Marvels we bring you Further More Mathematical Marvels. Enjoy another interactive and entertaining stroll through a variety of mathematical ideas in order to spark interest and discussion in the classroom. Basic number operations, algebra, geometry and probability are included, so a calculator might be useful. It is suitable for all ages up to infinity (but not beyond). Participants will be invited to share their own 'tricks of the trade'.

## **B11 Getting Started With FX Draw**

**Y7 - Y12, Tools and Technology, Lecture, Commercial**  
**Paul Hooper, Efofex Software**

This session is designed to help teachers new to FX Draw get started with this (sometimes) overwhelmingly comprehensive tool. We will focus on the basics of creating graphics and including them into documents and other formats. We will also guide you to the most important features of the product

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

whilst also giving you tools to help you develop your own knowledge of the product. If you have new staff in your team that need to get started with FX Draw, this is the session to send them to.

The session will include question and answer sections and our sessions are modified dynamically to suit the needs of the participants. We guarantee that you will leave the session having learned something that will impress long-term users of FX Draw.

While it is not necessary to have your notebook computer with you for this session, it can be helpful. We recommend that you have the latest version of FX Draw installed if at all possible.

## B12 Using manipulatives in the High School classroom

**Y7 - Y12, Tools and Technology, Workshop, Repeat**  
**Vicky Kennard, Australian Mathematical Sciences Institute (AMSI)**

Too often the use of manipulatives, or concrete materials, is portrayed as only for those with lower ability and not for high school at all. In many classrooms there are cupboards full of such equipment gathering dust. In this presentation I will be looking at why we should be using these resources and giving a hands-on demonstration on how we can do this effectively.

## B13 More Puzzles, problems and tricks of the trade.

**Y7 - Y10, Pedagogical Content Knowledge, Workshop**  
**Mike Ristovsky and Andrew Jefferies, Christ Church Grammar School**

It's not always easy to captivate kids in the mathematics classroom, but with some carefully crafted activities it is possible to get kids talking about the joys of mathematics that will allow teachers unique access to student thinking.

This session will run through 8 or more of my favourite activities that I have accumulated over the past 20+ years of teaching secondary students in classroom settings.

These activities have been chosen as they allow students to explore mathematics and make decisions and discoveries with the teacher acting as a facilitator rather than an instructor.

Participants will be guided through the activities at an easy pace, accessible to all. Handouts will be provided so the material can be used in classes on Monday morning. Please bring a calculator if you have one with you and an inquisitive mind.

## B14 Brain Training Maths Card Games

**F - Y10, Pedagogical Content Knowledge, Workshop, Repeat/Commercial**  
**Richard Korbosky, Dapma Pty Ltd**

These maths card games develops a player's thinking because players are quickly calculating in their heads. It is brain training activity because a player needs to adjust to the changing mathematical representations shown on the cards. The mathematics representations are shown in pictures, words or numbers and players are switching from one representation to another. There are 12 different maths card games. The maths card games improve students' fluency, understandings, estimation, basic facts, addition, subtraction and multiplication across a number of different mathematical ideas using different representations. The rules for the playing the games are easy and the same rule is be applied to the 12 different packs which are suitable for F – Year 10. The range of maths cards games allows the teacher to differentiate the classroom and allows students to self-improve their response times to many mathematical ideas that they are learning in maths.

## B15 Essential Mathematics for the Victorian and Australian curriculums

**Y7 - Y10, Tools and Technology, Lecture, Commercial**  
**VJ Gunawardana, Cambridge University Press**

The new editions of Essential Mathematics for the Victorian and Australian curriculums is powered by Cambridge HOTmaths to offer an even greater level of digital support for teaching and learning maths in Year 7-10. Learn how to make the most of the Interactive student resources and the Learning Management System for teachers, including Workspaces for showing student working, self-assessment tools, and the new Directed Task function.

## B16 Exploring eTasks

**Y2 - Y10, Context for Learning, Workshop**  
**Douglas Williams, Mathematics Centre**

Scores of schools across Australia, and beyond, have begun creating their own Task Library using eTask masters and their own materials. Why? A Task Library resources development of reasoning, communication, justification and problem solving skills in the context of learning to work like a mathematician. Tasks can be used in pairs, small groups or as stimulus for whole class investigations. They are supported by a massive collection of teaching notes and other support freely available through Mathematics Centre and the eTask Package supports you to run your own introductory workshop. Come, explore, consider.

## **B17 Developing fractional and algebraic thinking in middle years**

**Y5 - Y10, Curriculum/Assessment, Workshop**  
**Catherine Pearn and Max Stephens, The University of Melbourne**

To succeed in mathematics middle-years' students must move from additive to multiplicative thinking and from arithmetic calculations to generalised algebraic strategies. If we ask the right questions this progression can be monitored and prompted through fraction tasks. Students' solution strategies for fraction tasks vary from a dependence on diagrams, to methods that demonstrate algebraic reasoning. Based on testing and interviews two frameworks have been developed. The first is used to classify strategies students use to find an unknown whole, when given a known fractional part of the whole, and its equivalent quantity. The second framework monitors the extent to which algebraic reasoning is apparent when opportunities for generalised responses are prompted. This session will show teachers how to use appropriate tasks to identify the kind of strategies being used and how the frameworks can be used to progress students' mathematical thinking.

## **B18 Making Connections**

**Y7 - Y10, Pedagogical Content Knowledge, Lecture, Repeat**  
**Mike Clapper, Australian Mathematics Trust**

The curriculum is divided up into a number of boxes, but the real richness of mathematics comes in finding the connections between the boxes! This workshop takes the form of a demonstration lesson which investigates some surprising connections between topics leading to a reinforcement of critical concepts.

## **B19 COMBO- extending the original game to take it much further**

**F - Y6, Pedagogical Content Knowledge, Workshop**  
**Sue Gardiner, Merbein P-10 College**

This session will look at a simple game using dominoes or cards to develop students' ability to calculate equations across all four operations. We will look at how this one game can be differentiated to cater for students learning at all levels from Foundation to Grade 6 and beyond. I will share how I used this game to create a whole class 'challenge' that excited and extended students. Finally, we will learn from each other how it can be adapted further. You will be able to leave with many opportunities to use this one simple game with your students over and over again!

## **B20 A handful of favourites: Explore a collection of context rich investigations**

**F - Y6, Context for Learning, Workshop**  
**Ellen Corovic, The Mathematical Association of Victoria**

Context rich tasks can assist to draw learners into the mathematics at play. In this session, teachers will explore a handful of the presenter's favourite tasks. The role of challenge, persistence and student problem posing will be examined with practical tips for implementation. Come and immerse yourself in mathematical play through context rich investigations.

## **B21 Using Computers in a Maths Classroom with Year 7-10 Students**

**Y7 - Y10, Tools and Technology, Lecture, Repeat/Commercial**  
**Robert Rook, Mathplot**

This session will run through using technology (Mathplot) in the classroom for Years 7-10. Among the topics covered are graphing, consumer maths, fractions, geometry, measurement, mensuration, percentage, plotting, spatial relations, statistics, tessellations, trigonometry, probability to name a few.

The maths tutor, topic revision/test program, and homework book generator software will be explained. All attendees will receive a free registered copy of the latest programs for their home computers. Downloads available from [www.mathplotplus.com](http://www.mathplotplus.com)

## **B22 Reflection and Metacognition in The Mathematics Classroom**

**F - Y10, Tools and Technology, Workshop, Repeat/Commercial**  
**Genovieve Grouios, Consultant**

The great mathematician of the nineteenth century, Carl Friedrich Gauss recorded his key discoveries and thoughts through a mathematical diary. Within each entry, he engaged in critical reflection and mathematical discourse with himself, leading to new ideas which challenged many mathematicians of his time and thereafter. In Australian Mathematics Central (AMC), students can use the Number Diary, to discover the power of writing in mathematics. Here, they will discover the connections between language and mathematics and can begin to engage in metacognitive tasks, which encourage them to look beyond summarising an activity and move towards questioning, goal setting and dialogue.

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

This session will also introduce teachers to various resources available to them such as: professional learning videos linked to the curriculum strands, ideas on how to use guiding questions to stimulate thinking and discussion, formative assessment and ways to introduce key mathematical language and definitions. iPad or Laptop needed.

## B23 Mathematical Ideas in the Game of SET

**Y7 - Y12, Context for Learning, Workshop, Repeat**  
**Amie Albrecht, University of South Australia**

SET is a game that is more than just fun to play. Each card shows a design with four attributes. A SET is a group of three cards where each attribute is either the same or different across all cards. Along with encouraging logical and spatial reasoning skills, SET inspires many mathematical questions from players of all levels — from primary students to research mathematicians. Mathematical ideas in SET include counting and combinatorics, probability, geometry, modular arithmetic, vectors and linear algebra.

In this workshop we'll experience the mathematical thinking needed when exploring the game. We'll uncover just a few of the mathematical ideas in SET, which are adaptable to a range of year levels, and hopefully pique your interest for further exploration. No previous experience with SET is necessary.

## B24 Maximum Fun with Calculus

**Y11 - Y12, Tools and Technology, Workshop, Commercial**  
**Peter Fox, Texas Instruments**

If your students see fun and calculus as an oxymoron then perhaps they haven't tried some of these great calculus problems. Participants in this session will explore a range of great calculus problems that include paper folding, dynamic and interactive content that help students explore and understand the problem.

## B25 Connecting numeracy, mathematics and the world of work

**Y7 - Y12, Context for Learning, Workshop**  
**Dave Tout, Australian Council for Educational Research (ACER)**

This presentation will highlight a number of issues related to how mathematics and numeracy are crucial, underpinning skills required in the workplace, increasingly so in the 21st century. Dave will share his insights into numeracy/mathematics skills, trends and research gained from his extensive experiences in working in different workplaces, in adult education and training and in national and international numeracy research and assessment. The presentation will

reflect on this knowledge in relation to data about numeracy skills and abilities. Evidence exists to show that numeracy should be made a priority, and that it is vital to build the foundational numeracy and mathematics skills that work and life in the 21st century requires. And how can we better prepare our students for this world of work?

## B26 Really different Number and Geometry Activities ... yes really!!

**Y5 - Y8, Context for Learning, Workshop, Repeat**  
**Ian Bull, St Kevin's College**

Numbers are around us all the time. ISBN numbers in books as well as numbers used by scanners in supermarkets ... but how do they work? Come and find out ... the students in my mathematics classes know.

So you thought that the current Guinness World Record for folding a piece of paper was seven folds ... huh!! Come and find out what this has to do with mathematics.

If you bring a USB memory stick I'll give you the lessons as PowerPoint and Word files for free.

## B27 La Trobe Bendigo's new maths enhancement program

**Y7 - Y12, Networks as Communities of Practice, Workshop, Repeat**  
**Michael Payne and Toen Castle, La Trobe University**

La Trobe University's Bendigo campus has a small contingent of mathematicians teaching students from Science, Education, Engineering and IT. Most of our students are from the Bendigo region, and we are keenly aware of the historical decline in numbers of local high school students taking advanced maths subjects in the VCE. For this reason, we have started an extracurricular problem solving program for motivated students. As well as stimulating interest in maths, our aim is to let students experience the same excitement of discovery that we do in our research. Problem solving as an exploratory learning activity seems a much better model of "doing research" than traditional content plus assessment based pedagogy. In this session we will discuss our experiences running the program and give a hands on demonstration of how we guide students as they tackle the problems. Bring your pencils and paper!

## B28 Using Mathematica as an Effective Tool

**Y11 - Y12, Tools and Technology, Workshop, Repeat**  
**Brian Stokes, Monash University**

Using Mathematica as an Effective Tool in Teaching. This session offers a hands-on approach to the use of Mathematica in classroom teaching. The primary goal will be to provide a task-orientated experience introducing the breadth of Mathematica with a focus on its ease of use. Detailed instructions with clear examples will be presented so that participants will be sufficiently skilled to move forward from this initial learning experience. Learning is most easily facilitated by doing and that will be the spirit of this session. The basics of Wolfram Mathematica will be introduced including number representation, algebraic manipulation, solving equations, plotting graphs, differentiation, limits, integration and differential equations. In addition, parametric plots and multiple function plots will be introduced as well as basic commands in statistics. Preferably bring a laptop with Mathematica installed.

## B29 This one simple hack boosts Maths learning

**Y7 - Y12, Curriculum/Assessment, Lecture**  
**Bryn Humberstone and Katie White, Brighton Grammar School**

While not featuring heavily on Instagram, Pinterest or on school websites, a well-designed Maths curriculum makes a huge difference to the lived experience of teachers and students.

Helping students know what they are supposed to be learning is crucial for motivation and achievement, but this information often only exists in teachers' minds. At Brighton Grammar we have produced plans for each topic from Year 7 to 12 to provide clarity on the topic-level learning intentions and success criteria.

We will talk about how students use these plans to reflect on and understand the next steps in their learning, showing how we use them in conjunction with other resources to allow students to take responsibility for their own learning. We will also talk about how our unit plans have helped teachers write high quality assessment and revision tasks, another topic you won't read much about on Instagram or Pinterest.

## B30 Moving Maths Intervention into the Whole Class Setting

**F - Y6, Pedagogical Content Knowledge, Workshop, Repeat**  
**John Hein, Rebecca Forder and Rebecca Kerr, St James the Apostle PS**

If you are thinking mathematics intervention is great... but how do you apply the strategies into the classroom? Then we are able to help!

Our presentation will take you through our change journey from having no mathematics intervention to the successful implementation of Learning Framework in Number and Box of Facts in the primary years.

The main focus of the presentation will be to demonstrate how easy it can be to target the needs of all children in your learning community.

All participants will engage with materials, gain a deeper understanding of how to assess, collect data and teach the intervention strategies in a whole class setting.

## B31 Are your students ready for Year 7 Maths?

**Y6 - Y7, Curriculum/Assessment, Workshop, Repeat/Commercial**  
**Wendy Taylor, Mathsquad**

Having strong knowledge and high confidence in basic primary maths skills is the perfect way to start high school. Unfortunately for many students this is not the case. In this session I will answer the following questions and much more; What are the key primary maths skills that underpin success in high school? How can students improve their knowledge of these skills within an already crowded curriculum? How can we improve retention of the skills students are learning?

This session will also introduce the "Mathsquad Challenge", a program for students in Year 6 and Year 7 that will run during the month of February in 2020. For more information head to [mathsquad.org/challenge](https://mathsquad.org/challenge).

For more information on Mathsquad's free and paid for resources and services please head to [Mathsquad.org](https://mathsquad.org).



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

## B32 Widgets and UDFs in the classroom using TI-Nspire

**Y11 - Y12, Tools and Technology, Workshop, Repeat**  
**James Mott, Suzanne Cory High School**

In this workshop participants will learn how to make and use User Defined Functions (UDFs) and Widgets (dynamic files that can be imported into any document) on the TI-Nspire CX CAS calculator to aid your students in technology active assessment. Once participants make their own UDF and widget, they will see examples of how to incorporate widgets and UDFs within the classroom, and how students can make without adding additional burden on their workload. Participants will see examples of how to include such tasks in VCE Maths Methods and VCE Specialist Maths. Creating these resources is inherently an open-ended task and one which simultaneously provides students with an opportunity to learn the functionality of their calculator and to make their own commands and files to use in assessment. It is recommended that you bring your laptop with TI-Nspire CX CAS calculator software. TI-Nspire CAS handhelds will be available.

## B33 Classic Geometric Constructions

**Y9 - Y10, Tools and Technology, Workshop**  
**Neale Woods, Virtual School Victoria**

In this session, Neale Woods will cover classic compass and straight edge geometric constructions. Participants will do the constructions by hand and then replicate them using TI-Nspire technology. The activities will include a range of bisector and circle constructions. Compasses, rulers and TI-Nspire CAS calculators will be provided but participants are encouraged to bring their own, including laptops with the TI-Nspire software.

## B34 AI - Machine Learning and Algorithmics

**Y7 - Y12, Context for Learning, Lecture, Repeat/Commercial**  
**Craig Bauling, Wolfram Research**

For 30 years, Wolfram Research has been serving Educators and Researchers with one of the most comprehensive Statistics packages on the market. From this background Wolfram is now supporting companies around the world as they implement world leading AI strategies. From automobile vision systems, to facial recognition, to voice

activated knowledge systems, to text recognition; Wolfram is the technology behind many ground breaking applications. In this talk, Craig Bauling will introduce you to the basics of AI, Machine Learning, and Algorithmics which can then be directly introduced into your classroom. Topics of this technical talk include:

- Computation using Natural English Language
- Supervised Machine Learning
- Unsupervised Machine Learning
- Reactive Learning
- Neural Networks
- Deploying a simple Machine Learning project to the WWW

The content will help attendees with no prior experience get started with the Wolfram products; product freely available to every teacher and student in Victoria. All attendees will receive an electronic copy of the examples, which can be adapted to individual courses.

## B35 My Students Don't Know Their Tables!

**Y5 - Y10, Tools and Technology, Workshop, Repeat/Commercial**  
**Michael O'Reilly and Norrian Rundle, Norrian Michael Maths Education**

Too many students in the Middle Years do not have automatic recall or even efficient strategies to work out the Multiplication Facts. Too often, students resort to counting on their fingers, using the 'tables' on the back of their exercise book or calculators. This session will look at an alternate representation of the 'times tables', with associated efficient strategies for learning the Multiplication Facts. In this option you will be shown how to effectively teach the Multiplication Facts to Middle Years students who do have automatic recall. Excel spreadsheets will also be provided that enable targeted practise using efficient strategies. Although this is a Commercial Session, the ideas and teaching strategies covered in this session can be implemented in your classroom without purchasing the Times Tables Strategies App from the Apple Store.



### B36 ClassPad Tips and Tricks

**Y11 - Y12, Tools and Technology, Lecture, Repeat**  
**Charlie Watson, The Tuition Centre**

The 10th consecutive instance of this workshop will revisit some classic ClassPad tips and tricks relevant to upper school teachers and their students. From shift keys to sliders and eActivities to programs, we'll delve into most of the apps with the aim of working more efficiently and getting the results that we're after. Participants are welcome to bring their own ClassPad and try out tips as we go or you may prefer to just sit back, take a few notes and try by yourself later.

### B37 Investigating Integer Square Roots of Complex Numbers

**Y11 - Y12, Pedagogical Content Knowledge, Workshop, Repeat**  
**Ray Williams and Katie Bye, St Marks Anglican Community School**

Suppose  $\sqrt{a+bi} = c+di$  where  $a, b, c$  and  $d$  are all integers.

Under what conditions will this occur? This session begins with determining what these conditions are and then extending the investigating to determine how these conditions link to a particular sequence of prime numbers (also linked to Gaussian primes) and primitive Pythagorean triples.

### B38 Valuing student work in mathematics at Camberwell High School

**Y7 - Y12, Curriculum/Assessment, Workshop, Repeat**  
**Geoffrey Menon and Ursula Parker, Camberwell High School**

We will present the ways in which we specifically demonstrate to students the value of their work from year 7 through to year 12. This is achieved through a mix of creative assessment pieces, open-ended problem solving and presentation and through feedback to students.

### B39 Finding gaps in student learning! Are you struggling to engage middle school students in the maths classroom?

**Y7 - Y12, Curriculum/Assessment, Repeat, Lecture**  
**Adam Kruger, Wesley College**

Students learn best when they are motivated to learn by seeing the value and importance of the information presented. This presentation will exhibit an effective way to analyse student results along with how to engage students in the classroom.

Throughout the session I will demonstrate how I motivate students to learning, create an interactive atmosphere to allow for student voice, build connections through directed assessments, provide opportunities to apply knowledge to real world situations, challenge and engage students through effective feedback strategies.

I will demonstrate how I effectively analyse student results using a data tool to identify key areas of concern/weakness.

By the end of the session, each attendee will walk away with engaging activities, strategies that they can use immediately in their classroom. Bring your laptop.

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

## B-C01 Developing early maths concepts through play

**F - Y2, Pedagogical Content Knowledge, Workshop, Repeat Leah O'Neill, Kennedy Press**

Young students are active participants in their learning, particularly when engaged in play contexts but how do we best use play to teach mathematical concepts and ensure deep understanding?

Participants in this workshop will explore the characteristics of good maths learning for young students and develop a short unit of work for use in their own classroom. This will be based on a simple planning structure that follows a sequence of lessons that includes:

- Child initiated spontaneous play
- Teacher initiated discussion of the mathematical focus
- Challenging problems
- Student developed strategies, sharing and practice
- Questions and activities that require students to transfer and adapt what they have learnt.

Ideas for implementation and for recording student progress will also be presented and discussed.

## B-C02 Embedding Active Pedagogy into Teacher Education targeting Mathematics: Transform-Ed!

**F - Y6, Networks as Communities of Practice, Workshop, Repeat Paul Dann, Introducing Mathematics**

Low levels of physical activity and high levels of sedentary behaviour are widespread public health issues, pervasive in schools. Teacher education is pivotal to school and educational reform, but an under-studied setting for physical activity and sedentary behaviour research. The overarching aim of this research (Transform-ED!) is to investigate the impact of incorporating an evidence-based active pedagogy targeting Maths education, on the teachers' capacity to increase children's physical activity, reduce sitting time and improve academic-related outcomes.

This workshop aims to provide an insight into evidence and findings around Transform-ED! as well as a comprehensive and interactive practical application of the active pedagogy used in the maths unit.

Although the session is focused on the Primary Years curriculum, it would be suitable for all maths educators as it will provide innovative, dynamic and evidenced-based activities and resources that could be used in primary, secondary or tertiary maths education.

## B-C03 Teacher student collaboration: promoting mathematical creativity and curiosity.

**F - Y8, Curriculum/Assessment, Workshop Kristie Gibson, Melissa Sokol and Lana Fleiszig, Mount Scopus Memorial College**

What if every learner looked forward to learning maths? What if learners naturally sought connections in mathematics? What if learners left each day with an urgency to learn more? What happens when students are trusted to make decisions about their own learning? In this teacher/student facilitated workshop, we will reflect on the process of moving learners from a mindset of compliance and dependency to one of curiosity and action. We will explore the power of student decision making, the importance of a spirit of playfulness, and the benefits of a more transparent and responsive approach to assessment and planning.

Students will be co-facilitating this workshop.

## B-C04 Constructing statistical application tasks in Further Mathematics

**Y11 - Y12, Curriculum/Assessment, Lecture, Repeat Peter Jones**

As part of their school-based assessment, Further Mathematics students are required to complete a statistical Application Task. This session aims to guide participants through the process of taking a data set and using it to develop the sort of questions suitable for use when constructing a statistical analysis task. Topics covered will include, finding suitable real-world data sets and the many pitfalls, primary versus secondary data, sampling, formulating appropriate statistical questions that cover an appropriate range of levels of difficulty and why it is hard to find a single real-world context that will cover the full breadth of the curriculum. Web references to some data sets that might be used suitable for constructing future tasks will be provided.

### **B-C05 Masterclass: Thrive and survive: The first five years of secondary school teaching!**

**Y7 - Y12, Pedagogical Content Knowledge, Workshop, Danijela Draskovic and Helen Haralambous, The Mathematical Association of Victoria**

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. (ref below). With the balance of classroom management, 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 workshop we will share and unpack engaging warm ups/ games, a bank of accessible resources, efficient assessment and data collection, handy hints for managing students and mindfulness for you! This special masterclass will assist graduate teachers to navigate their first five years in the classroom with resources, tips and hints to ensure they are waving, not drowning!

### **B-C06 You don't need to differentiate everything – it's the Big Ideas that make a difference!**

**F - Y10, Curriculum/Assessment, Lecture Dianne Siemon, RMIT University University**

Access to multiplicative thinking and the Big Ideas in Number that support this from Foundation to Year 10 is essential for meaningful participation in school mathematics. Formative assessment holds the key to improving mathematics learning outcomes but not everything needs to be assessed formally and not everything needs to be differentiated. Targeted teaching is specifically concerned with addressing students' learning needs in relation to a big idea in Number without which their progress in school mathematics will be seriously impacted. This lecture will revisit the assessment for common misunderstanding materials and tease out the key underpinning ideas and strategies needed at different levels of schooling to ensure students make the shift from additive to multiplicative reasoning.

### **B-C07 Why Numeracy and why now?**

**F - Y12, Curriculum/Assessment, Workshop, Kerryn Sandford, DET - Pathways @DET principal participant**

This workshop will draw from current evidence and research around the need to address student Numeracy skills and Numeracy learning in schools.

It will investigate practices both in and out of the Mathematics classroom that enable students to develop numeracy skills and also address the issues around engagement of students in mathematics and will examine what is needed for teachers to be able to change their practice effectively to meet these needs.

Existing resources to assist schools to further develop their Numeracy plans will be introduced and participants will have opportunity to explore some of these resources and apply them to developing their own strategies for enhancing student numeracy skills.

### **B-C08 A day in the life of a Mathspace teacher and student**

**Y7 - Y12, Tools and Technology, Workshop, Repeat/ Commercial Craig Blake, Mathspace**

What's a day in the life of a Mathspace teacher and student like? We've created a workshop for teachers that are new to Mathspace and want to experience what it's like teaching and learning on Mathspace.

As a student, you'll get to try your hand at an adaptive task and experience what it's like getting step-by-step formative feedback as you work. Then you'll dive into one of our diagnostic tests and see how we measure your performance against curriculum outcomes.

As a teacher, you'll get to create a task, and measure your own results on the diagnostic. This is an interactive session, so you will need to bring along a Wi-Fi enabled device (e.g. laptop, tablet / iPad).

# SESSION C, Thursday, 12.10pm-1.10pm

## C01 2018 Math Methods Examinations

**Y11 - Y12, Curriculum/Assessment, Lecture,**  
**Allason McNamara, Trinity Grammar**  
**Mary Papp, MacRobertson Girls' High School**

Mary and Allason will do a similar session to the 2018 MAV Meet the Examiners Lecture for Mathematical Methods as well as discuss common errors from previous years.

## C02 Free resources for delivering excellence in financial literacy

**Y7 - Y10, Tools and Technology, Workshop, Repeat/**  
**Commercial Damian Nicholson, Financial Basics**  
**Foundation**

Financial Basics Foundation provides free of charge to all Australian secondary teachers, extensive resources and services designed to support students to develop capacity to make responsible and informed financial choices.

The Victorian Mathematics Curriculum offers a significant opportunity to use financial literacy as a context for a range of mathematical operations and applications in your classroom. This workshop will focus on exploring ESSI Money, an interactive online game which delivers an innovative app-based environment. Students practice a wide range of real life earning, saving, spending and investing transactions, and experience the financial consequences in a safe, fun and challenging way.

## C03 Targeted Teaching through a Learning Progression in Geometric Reasoning

**Y - Y10, Curriculum/Assessment, Workshop, Repeat**  
**Marj Horne, RMIT University University**

Come and explore some engaging activities for geometry using easily accessible materials. These activities are linked to an evidence based geometric reasoning framework of big ideas across the middle years of schooling developed by the Reframing Mathematics Futures Project based at RMIT University. Targeting teaching for students to help them think mathematically and catering for the diversity of experience within any classroom can be done easily using any of these tasks. Evidence from international studies is that Australia lags behind the rest of the world in geometry. We can make a difference to the students' futures helping them to more easily access STEM through tasks that are fun and easy to use but that focus on the important big ideas in geometric thinking. It would be useful for delegates to have some A4 paper, a ruler and a pencil.

## C04 Connecting mathematics to the real world!

**F - Y4, Context for Learning, Workshop,**  
**Pam Vilsten and Matthew Ferguson, South Yarra Primary**  
**School**

The workshop will explore fun ways to offer success to all students in mathematics and dive into the writing and delivery of worded problems in the early years of primary school. Come and hear our learning journey, which started 3 years ago with a focus on building teacher capacity in enabling and extending students in mathematics. Walk away with some new ideas to engage your learners in making their mathematical connections.

## C05 Making Maths Engaging for Students AND Teachers!

**F - Y6, Context for Learning, Workshop, Repeat**  
**Bernard Kerrins, Bendigo Secondary Network Schools -**  
**Weeroona College, Bendigo South East College, Crusoe**  
**College**

Students often say that what we are teaching them has little relevance or purpose. Much of what is taught has no context or immediate use, leading to boredom with maths.

They are becoming knowledgeable, but not knowledge-able.

Even when we ask them to do relatively somewhat engaging activities, it becomes dress rehearsal learning as there is no real purpose to it.

This workshop will focus on 3 aspects:

- \* Using rich contexts for learning where students can connect their learning to real life experiences.

- \* How teachers can become more invigorated and excited about their lessons, and passing this enthusiasm on to their students.

- \* Project Based Learning, completing projects that leave a legacy for others and creating hooks to engage our students.

This workshop will have you and your students wanting to rush into your maths lessons as they will now have a real purpose for learning.

## C06 Mathematically Rich Tasks in Primary Schools

**F - Y6, Pedagogical Content Knowledge, Workshop,**  
**Russell McCartney and Chris Terlich, Inverloch Primary School**

What's the main thing that most teachers want out of a PD? Something that they can easily implement into their classroom the next day! This hands-on workshop will give participants the opportunity to explore mathematically rich learning tasks, using resources that should be easily accessible in all classrooms. Many of these tasks can be used across all the primary year levels F-6, while allowing access for all students. This session is suitable for primary teachers who are interested in creating a positive learning culture in mathematics. This workshop is for teachers who are interested in using concrete materials in their classroom to provide rich learning experiences for students.

## C07 Strategies for understanding geometry – make it, draw it, name it, know it

**F - Y8, Pedagogical Content Knowledge, Workshop**  
**Richard Korbosky, Dapma Pty Ltd**

This session will be 'hands on' aimed at developing Primary students understanding, thinking and reasoning skills in shape. There will be a focus on manipulative mathematics materials to help students to visualize, communicate, draw and reason accurately. Participants will be introduced to the NEW Mathomat (Primary) which allows children to draw 2D shapes accurately, allows them to be creative in their drawings and allows them to keep an accurate recording of the geometry work they have been involved in.

## C08 Making connections through games in VCE Maths

**Y11 - Y12, Pedagogical Content Knowledge, Workshop, Repeat**  
**Rosalind Willsher and Emily DiBella, St Augustine's College**

Many of our most creative ideas and "Aha" moments occur when we are relaxing or having fun, rather than intensely focussed on our learning. In maths, we can allow our brain the opportunity to wander and make connections between ideas by playing games. In this session we will share (and play) games that will support learning in VCE maths. This includes games to tune in at the start of a lesson, revise previous content, break up long double periods in a constructive way and to support hands-on and active learners. The content will be based on VCE maths, but many of the ideas could be adapted for lower year levels.

## C09 Improve Lesson planning and student engagement while saving time.

**Y7 - Y12, Tools and Technology, Lecture, Repeat/ Commercial**  
**Bill Murray, Mentone Girls Secondary College**

Improve lesson planning and student engagement while saving time.

The cloud-based Classroom Organiser planning and student tracking system enables teachers to prepare and document individual topic/lesson plans in an easy to use file. This process streamlines planning by operating in a realistic manner that teachers recognize and understand (this is a considerable time saving for teachers)

The system encourages teacher/student collaboration in setting a differentiated learning plan to meet individual student needs and assists self-paced learning by enabling students to work through various levels of achievement. It provides easy access to lesson plans encouraging collaboration and real time discussion between teachers and students.

The system tracks student progress in real time (indicative not prescriptive) and communicates assessments to students and parents (using separate log-ins) within a few days of task completion.

## C10 Powerful Conceptual Models

**Y7 - Y10, Pedagogical Content Knowledge, Lecture,**  
**Claire Moriarty, Phoenix P-12 Community College**

Conceptual models provide a scaffold for learning. They give students something to hang their understanding on and a jumping off point for students to extend their knowledge further to solve unfamiliar problems. They help students develop confidence and mathematical intuition. But are some conceptual models more useful than others? A good conceptual model can do all of the above. But a great model also makes explicit the connections between topics. In this workshop we look at some great models that do all this. Teachers will leave with a framework for unit planning and to guide student thinking in a number of units that allow students to view mathematics as a whole rather than a collection of separate topics.



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

## C11 Connections through mathematical modelling

**Y7 - Y12, Context for Learning, Lecture, Repeat**  
**Ross Turner and Jim Spithill, Australian Council for Educational Research (ACER)**

For those of us in mathematics education, the most important connections to be made are between the mathematical knowledge one holds, and the opportunities one meets to use that knowledge.

- Goes to the purpose of studying mathematics
- Motivates learning mathematics
- Provides a tool for application of relevant knowledge

This presentation will cover

- The history and operation of The International Mathematical Modeling Challenge (IMMC) internationally and in Australia
- The modelling problems used in IMMC
- Some observations on work done by Australian teams
- Some pointers to building mathematical modelling expertise among teachers and students, and as a critical part of future maths classrooms

## C12 Conceptualise and understand Mathematics with Geometry

**Y7 - Y12, Tools and Technology, Workshop,**  
**Sanjeev Meston, Flinders Christian Community College**

This session will focus on using the geometry application in conceptualising key concepts and ideas in Mathematics using the Geometry Application on the TI Nspire teacher software or on CAS calculator. The session will help teachers with constructions, simulations, analysis of concepts, and also in extending the geometry application into the Physics classroom (some aspects of Forces, Optics, etc will be covered in this session). Attendees will benefit if they attend the session with a trial version or licensed version of TI Nspire teacher software on their laptops. They can install the software on a 90 day trial period. Download link: [https://education.ti.com/en/software/details/en/b993f3bd97d94d7ea35e5d514dd57fb5/ti-nspirecx-tps\\_sda](https://education.ti.com/en/software/details/en/b993f3bd97d94d7ea35e5d514dd57fb5/ti-nspirecx-tps_sda)

## C13 Challenging, coherent, cumulative experiences that engage all students

**Y7 - Y10, Curriculum/Assessment, Lecture**  
**Peter Sullivan, Monash University**

This session will illustrate approaches to engaging all students by activating thinking through challenging tasks with learning consolidated by further tasks carefully varied. Participants will work through an illustrative learning sequence and discuss ways that pedagogies associated with such teaching can address learning needs of all students.

A similar session is available for F -Y6 teachers in the next timeslot.

## C14 The future of grades and the impact on growth mindset

**Y7 - Y12, Tools and Technology, Lecture**  
**Tamara Heaney, Mathspace**

Imagine a future where students' reports chronicle their progress against goals they set with their teacher. Is that likely? And if yes, how far off is it?

In this session we will look into the history of the traditional grading system, the purpose of assigning traditional grades to students and whether it correlates with student achievement.

We will then consider a growth mindset (Carol Dweck and Jo Boaler), focusing on:

How to foster a growth mindset in mathematics classes

Whether the traditional summative grading (A-E) system allow students to develop a growth mindset

Finally we will look at how we can better assess students to encourage them to develop a growth mindset in mathematics classes and leave their fixed mindset behind.

## C15 Using the e5 Instructional Model in Maths

**F - Y6, Curriculum/Assessment, Workshop, Repeat**  
**Nichole Skews, Eastwood Primary School**

The e5 Instructional Model has been a feature of effective classroom practice for many years as it utilises the features of inquiry based learning. Using an inquiry model to teach Mathematics enables students to engage, explore, explain, elaborate and evaluate their mathematical thinking and skills. This presentation, will share how Eastwood Primary School and Deaf Facility reinvigorated our whole school Maths program by implementing the e5 model. The result of this being a dramatic increase in student engagement, productive



student discussion around mathematical thinking and reasoning and a deeper understanding of concepts. In this practical workshop, participants will gain an understanding of the e5 model and the process used to plan and deliver this model of instruction.

### C16 What's Inside an Escher Print?

**Y5 - Y12, Context for Learning, Lecture**  
**Toen Castle, Christopher Lenard and Katherine Seaton,**  
**La Trobe University**

Art galleries provide a refreshingly different context for learning mathematics, and the art of M.C. Escher is so novel and refreshing that it has taken a place in popular culture.

We will explore some of the mathematical ideas in the works of M.C. Escher - tessellations, impossible figures, and hyperbolic planes. Along the way we will see how Escher was not simply an artist, but grappled with groups, perspective, and non-Euclidean geometry in his own visual language. He was an artist who went out of his way to connect with mathematicians, and they with him, with many of his playful prints used to illustrate abstract concepts.

### C17 Mathematics Learning Difficulties

**F - Y8, Pedagogical Content Knowledge, Workshop,**  
**Repeat**  
**Nathalie Parry, Speld Vic**

This workshop will provide participants with an understanding of the characteristics of mathematics learning difficulties including dyscalculia. Dyscalculia is an innate difficulty in learning or comprehending mathematics. Students with Dyscalculia have trouble understanding numbers, learning how to manipulate numbers, learning mathematical facts, and a number of other related difficulties. The DfES (2001) defines dyscalculia as 'a condition that affects the ability to acquire arithmetical skills. Dyscalculic learners may have difficulty understanding simple number concepts, lack an intuitive grasp of numbers, and have problems learning number facts and procedures. Even if they produce a correct answer or use a correct method, they may do so mechanically and without confidence.' Workshop participants will review a range of practical strategies that will support these children in their mathematics and numeracy development, both in and out of the classroom.

### C18 Number Talks in the Primary Classroom

**Y3 - Y6, Context for Learning, Workshop, Repeat**  
**Renee Patel and Lauren Lamont, Mitcham Primary School**

Number Talks are an engaging way to give all students an opportunity to share, and build, on their strategies to mentally problem solve. This exposes students of all levels to the opportunity of learning from collaborative conversation. A Number Talk is a five to fifteen minute classroom conversation around purposefully crafted computation problems that are solved mentally to build number sense and mathematical reasoning. Number sense is something that cannot be taught, however, it is through exposing students to activities like Number Talks, that this vital key to their learning can develop.

In this session you will see what a Number Talk looks like and learn how to run one. You will walk away with resources you can use in your school instantly, as well as skills to create your own!

### C19 A Conversation about Out of Field Teaching

**Y7 - Y12, Networks as Communities of Practice,**  
**Workshop Michael O'Connor, MAV and AMSI**

A significant part of the role of MAV president is to advocate for excellence in mathematics teaching. One way to do this is through conversations. At this year's conference Michael O'Connor will invite key stakeholders to discuss the issues associated with being an out of field teacher of mathematics at secondary level and the challenges involved in supporting them. The panel will also be asked to outline how they and their organisations can help develop and provide initiatives to assist out of field teachers in upgrading their knowledge and skills over a manageable time frame. Those teachers who identify themselves as out of field in mathematics, as well as department leaders, are invited to join this session and contribute to the Q and A section.

### C20 The Three P's of Performance

**Y9 - Y12, Curriculum/Assessment, Lecture**  
**Dietmar Schaffner, Penleigh and Essendon Grammar School**

This workshop explores the findings of a school-based peer research project on the key obstacles to optimal performance in high-stakes assessment like the Year 12 VCAA Maths Methods Exams. Using observation, student work samples,

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

interviews and written reflections, the project identified three broad obstacles: panic, poor preparation and poor practice. The project also trialled approaches for reducing these obstacles, focussing particularly on practising careful, systematic and precise mathematical working and on developing strategies for dealing with exam anxiety.

## C21 Differentiation Through Engaging Games

**F - Y6, Context for Learning, Workshop,**  
**Catherine Epstein and Mandi Mackey, St Peter's East Bentleigh**

Games are a great way to hook children in. Not only are they fun but they can also help develop understanding or explore a particular strategy.

Come and join us as we investigate a range of games that promote efficient mental strategies whilst also being open to easy differentiation.

## C22 CANCELLED

## C23 Open-ended Tasks in Maths Methods

**Y11 - Y12, Curriculum/Assessment, Workshop**  
**Trang Pham, Methodist Ladies' College**

Mathematical reasoning is when students are able to analyse, prove, evaluate, explain, infer, justify and generalise. Open-ended tasks provide opportunities for students to develop the ability to make choices, interpret, formulate, model and investigate problems, and communicate solutions effectively and efficiently. Open-ended tasks are often designed to be fun so that students are more engaged in primary school. However, many students seem to struggle with the openness of these tasks in secondary level. How and when do teachers prepare students for these tasks in Maths Methods? This workshop will go through the process of creating some open-ended tasks which can be introduced to students before they hit Year 12. While we are here let us explore and investigate some practical ideas to create an open-ended SAC for year 12MM! Please bring along some samples of open-ended tasks which you have used in your class for shared discussion.

## C24 Maths and Music – play me a tune on your calculator

**Y7 - Y10, STEM – linking mathematics education to industry and further study, Workshop**  
**Brian Lannen, Wodonga TAFE**

Music can be represented in code. Coding can be done on your calculator and your TI calculator can drive a speaker in the TI-Innovator™ Hub. A forensic science scenario is used

to introduce a case for analysing sound waves. Both the generation and analysis of sound is considered along with a mathematical examination of period, frequency and note. Bring your TI-Nspire CAS

## C25 The Art of Mathematics

**Y5 - Y12, Tools and Technology, Workshop**  
**John Bament, O'Loughlin College**

Delivery drones, autonomous Uber, robotic factories and space exploration are happening now. In this practical, hands-on workshop you will program robotic cars to draw various shapes and solve numerous puzzles. Leave with your own piece of mathematical art and some practical examples of how robotics can be used in your classroom and their application to the Australian Curriculum and the real world. Inspire your students to be the next Elon Musk ... or better!

## C26 Differentiating Explorations with Manipulatives and Technology.

**Y5 - Y6, Tools and Technology, Workshop**  
**Amy Somers and Leonie Haggett, Lyndale Greens Primary School**

In this session we will focus on ways to cater to a range of abilities in the classroom through exploring patterns. We will use manipulatives and technology to help develop student's understanding at their point of need.

Participants are encouraged to bring their own device if they would like to have a go at using Microsoft Excel to investigate efficient strategies to perform calculations, however all notes on how to do this will be included in the presentation and could be attempted back at school. This will provide teachers with an example of how to use coding in a practical way in their Mathematics classes.

At the end of the session participants will have a sequence of three lessons that they can use with their class that use manipulatives, allow for differentiation and explore links to technology. If you would like to bring a device with Microsoft Excel for one of the activities it would be beneficial but isn't necessary.

## C27 Mathematical Methods Unit 3: Introducing Discrete Random Variables

**Y11 - Y12, Pedagogical Content Knowledge, Workshop**  
**Peter Flynn, Texas Instruments**

In this Unit 3 Mathematical Methods workshop, effective ways of introducing the concept of a discrete random variable and associated discrete probability distribution(s)

are showcased. The technology used to conduct various simulations in this workshop will be TI-Nspire CAS CX. However, teachers who use other peRMIT Universityted technologies are most welcome to attend and no prior TI-Nspire CAS CX experience is required.

### C28 Using Data To Inform Your Teaching

**F - Y6, Curriculum/Assessment , Lecture, Repeat, Commercial**  
**Andrew Spitty, Essential Assessment**

In this hands-on session, participants will use a number of different data sets to explore how to read, interpret and then plan to inform a mathematics teaching scenario. The data sets will be presented in a number of different formats; including spreadsheets. The interpretation will include linking to the mathematics curriculum. Participants will work in groups to discuss and consider how to plan with the data to inform, and drive teaching.

### C29 Further Mathematics Exam - featuring efficient ClassPad use

**Y11 - Y12, Curriculum/Assessment , Workshop, Repeat**  
**Elena Zema, Casio Education**

This session will present approaches to the 2018 VCE Further Mathematics Examinations. These approaches will incorporate the use of CAS as well as 'manual' solution methods. At times, two alternative methods may/will be presented. The providing of two solutions is intended to encourage a conversation between teachers (and students) about the most discerning and efficient way to tackle the mathematics presented in this form of assessment. BYO of technology of choice.

### C30 Producing brilliant mathematical diagrams

**Y7 - Y12, Tools and Technology, Lecture, Repeat/ Commercial**  
**Geoff Phillips and Ann Phillips, Geoff Phillips Publications**

Learn how to use a powerful, free vector graphics program to produce virtually any type of mathematical diagram or graph with full control over every element. Diagrams may be copied into Word or converted directly to pdf. Your worksheets and tests will look sharper than ever! No need to bring a computer, as the session will be filled with examples and instruction in preparation for later use.

### C31 Learning Fractions With Picture Puzzles

**Y2 - Y8, Tools and Technology, Workshop**  
**Douglas Williams, Mathematics Centre**

This session offers a differentiated, multiple intelligence approach involving seeing, touching, saying and recording fractions in natural language. The approach precedes, and strengthens fluency with, the symbolic fraction form. We will use Cuisenaire Rods in an introductory activity-based discussion, then partners will use Picture Puzzle challenges to explore further. You will need a web-connected device which opens PDF to use with a partner. We will begin to learn to 'seek the whole' when attempting to solve any symbol or word based fraction exercise. You will also discover that you can make your own Picture Puzzles.

### C32 Small Shifts, Big Gains

**Y7 - Y10, Curriculum/Assessment , Workshop, Repeat**  
**Deb Carmichael and Karen Milkins-Hendry, Independent Schools Victoria**

'... most teachers plan their lessons as if they're going to go perfectly and we suddenly find that no lesson plan survives the first contact with real children.'

Dylan William, Teacher Magazine Podcast, March 2019.

When and how do you check in with students to know whether to rewind, regroup, move on or pause? How reliable is the evidence you are collecting and how are you using it to plan your next steps? In this workshop we will explore the power of checkpoints and provide some take away tools to build responsiveness into your lesson plans and enhance student learning.

### C33 CAS in Specialist Mathematics Classroom

**Y11 - Y12, Tools and Technology, Workshop**  
**Bozena Graham, Wesley College**

How can we enhance learning of new concepts in Specialist Mathematics? Teach our students for deeper understanding by investigations, modelling, explorations and problem solving. How to ensure students are indeed using CAS in an effective way? Applications to classroom activities, SACs and exams. Please bring your TI Nspire CAS calculators with the latest operating system.

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

## C34 Build your own ClassPad functions and programs

**Y11 - Y12, Tools and Technology, Workshop, Repeat**  
**Charlie Watson, The Tuition Centre**

This hands-on workshop is designed for users who want to add more functionality to their ClassPad. Starting with the Define command in Main, we'll move on to problem solving using a sequence of steps that can be saved as an open program in eActivity and conclude by writing a simple program in the Program app. Pointers to further learning resources will be shared. A basic working knowledge of ClassPad will be needed to keep up with the hands-on activities but curious spectators are equally welcome.

## C35 Digital diagnostic assessment - be smart about planning

**Y7 - Y10, Curriculum/Assessment, Lecture, Repeat/Commercial**  
**Vanessa Rule-Paddle and Lindy Sharkey, Pearson**

This session focuses on how using digital diagnostic assessment tools can make planning for learning more specific to students' needs. It draws on several studies which have shown how teacher planning has been impacted by such information. Online assessment tools can be used to provide diagnostic information about students' thinking. One such tool is 'Specific Mathematics Assessments that Reveal Thinking' (SMART) tests. The SMART tests system includes individual student diagnoses and teaching advice consisting of potential student difficulties and how to address these. Findings suggest teachers and their students can benefit from access to developmental stages associated with learning specific concepts and the potential difficulties students may encounter.

## C36 MAWA Competitions & Resources for Reciprocal Members

**F - Y10, Pedagogical Content Knowledge, Workshop, Repeat**  
**John West, MAWA / Edith Cowan University**

In this presentation John will share his experiences from the inaugural AAMT Singapore tour in April 2019, discuss MAWA's popular Have Sum Fun and Have Sum Fun Online competition formats, and explore a range of newly-developed resources for competition mathematics, hands-on teaching and learning, beginning teachers, and parents.

## C37 Nailing the 2018 Methods Exam 2 with a ClassPad

**Y11 - Y12, Tools and Technology, Workshop, Repeat**  
**Alastair Lupton, Le Fevre High School**

This workshop will look at aspects of the 2018 Mathematical Methods Examination 2 through a lens of optimising success through discerning and efficient ClassPad use. Portions of a set of video solutions will be shared and methods will be discussed.

## C38 MathsCraft - working like a mathematician!

**Y4 - Y10, STEM, Workshop, Repeat**  
**Jacqui Lee, Ruyton Girls' School**  
**Anita Ponsaing, ARC Centre of Excellence for Mathematical & Statistical Frontiers (ACEMS)**

A MathsCraft workshop, sponsored by ACEMS, enables participants to explore, discover and describe mathematical structures for themselves. Students explore, make conjectures, prove or disprove those conjectures, figure out 'why'... and in doing so get a sense for what makes mathematicians love maths! Come and experience one of the sessions and learn more about program, and see what it's like to 'do maths like a research mathematician'.

MathsCraft is the flagship outreach program of ACEMS, the Australian Research Council Centre of Excellence for Mathematical and Statistical Frontiers.

## C39 Using Mathematica as an Effective Tool

**Y11 - Y12, Tools and Technology, Workshop, Repeat,**  
**Brian Stokes, Monash University**

This session offers a hands-on approach to the use of Mathematica in classroom teaching. The primary goal will be to provide a task-orientated experience introducing the breadth of Mathematica with a focus on its ease of use. Detailed instructions with clear examples will be presented so that participants will be sufficiently skilled to move forward from this initial learning experience. Learning is most easily facilitated by doing and that will be the spirit of this session.

The basics of Wolfram Mathematica will be introduced including number representation, algebraic manipulation, solving equations, plotting graphs, differentiation, limits, integration and differential equations. In addition, parametric plots and multiple function plots will be introduced as well as basic commands in statistics.

## C40 Differentiating learning through Success Criteria

**F - Y6, Curriculum/Assessment, Workshop, Repeat  
Paul Staniscia, St Joseph's Primary School**

Mathematics classrooms need to be a place where all students can learn and be challenged. However, the difficult role teachers have is differentiating the learning so that all students can access the mathematics. When using Learning Intentions and Success Criteria teacher clarity is enhanced as learners understand what they are learning, why they learning it and how they know when they have learnt it. So when we differentiate the learning, to support all students, instead of differentiating the task would it be more clear to students if we differentiated what the success looked like? This would enable all learners to access the learning and then identify success where it best suits them. This workshop will explore practical ways teachers can differentiate success criteria so that all students can make progress in their learning.



# SESSION D, Thursday, 2.30pm-3.30pm

## D01 Multiplication: A sign of the times

**Y5 - Y10, Pedagogical Content Knowledge, Workshop, Repeat**  
**Stephen Hanlon, Braemar College**

In this practical workshop you will learn some shortcuts and alternative methods for squaring and multiplying two digit numbers. These techniques are easily used in the classroom, either as a warm-up or as a change-up to a lesson. Help your students improve their mental arithmetic and by hand processes, whilst escaping their dependence on an electronic calculator.

It is a chance to become a better mathematician or even a mathematician! Please bring some thing to write with, and a sense of adventure.

## D02 I don't understand the question - EAL

**Y5 - Y12, Pedagogical Content Knowledge, Workshop, Repeat**  
**Sean Kelleher and Sharon Lei, Noble Park English Language School**

What makes school mathematics texts so difficult for English as an Additional Language (and other) students, and what are some ways we can help build up the academic language resources for those students?

The written and spoken language that we use in the maths classroom can be baffling to EAL students, and sometimes to all but the most literate of first language speakers. And yet it isn't always obvious to the teacher where the difficulty lies, let alone how to overcome it.

In this session we will look at:

- Some of the vocabulary and grammar difficulties common in maths questions and explanations.
- Some possible reasons that students aren't acquiring the language they need.
- Some strategies teachers can use to help students construct the linguistic resources for academic success.

Sean and Sharon are mathematics and EAL specialists at Noble Park English Language School. A laptop or tablet capable of accessing [student.demos.com](http://student.demos.com) would be an advantage.

## D03 More blocks and less blocking

**F - Y4, Pedagogical Content Knowledge, Workshop**  
**Cassandra Lowry, Australian Mathematical Sciences Institute (AMSI)**

Traditionally, mathematics units are taught in blocks. Students will spend a week or so on a given topic, be assessed, then move onto the next topic. Teachers are often surprised later in the year when students seem unable to recall content that has previously been covered.

Recent research in cognitive brain science suggests one way to overcome this lack of retention may be through the spacing of ideas and the interleaving of different but related topics.

While this approach may have its merits, how can teachers revisit content while still meeting the demands of their school's yearly overview or scope and sequence?

This workshop will aim to overcome this challenge. Participants will be shown a range of hands-on games, activities and assessment tasks that will help students retrieve key concepts while encouraging them to apply their knowledge and skills to new situations and problems.

## D04 Effective Team Teaching in a Mathematics Classroom

**Y5 - Y6, Curriculum/Assessment, Lecture**  
**Eadaoin Lorigan and Tanya Tanner, Lumen Christi Catholic Primary School**

Based on needs based research, experience and professional development, we will share some of our team teaching experiences relating to differentiation, open-ended tasks, assessment and allocation of resources in an effective and practical way. My colleague and I have taught in open plan, diverse learning environments and wish to share effective strategies and resources to help teachers efficiently use their spaces and their team members in order to plan, teach, enable, extend and assess a large number of different students in the area of Mathematics. We wish to present an engaging and informative presentation valuable to teachers who wish to enter into this contemporary teaching model.

## D05 Top Tips to Accelerate Learning

**F - Y6, Curriculum/Assessment, Workshop, Repeat**  
**Ian Stevens, Maths Adventures Ltd**

This workshop looks at practical tips to accelerate student learning. The complexity, wide range of abilities and competing demands in classrooms makes this very

challenging, however there are research based and classroom tested ideas that can turn strugglers into successful, actively involved and positive students. This workshop rejects the idea that some students cannot learn maths.

We will explore a range of activities, rich tasks, and resources during the workshop that you can use next week. Both hands on and digital resources will be explored as well as looking at how technology can be used to support accelerated learning. This workshop is about accelerating students learning within classrooms. Accelerating conceptual understanding and the ability to use the maths they learn, at the same time as developing essential 21st Century competencies.

### **D06 Fun fractions with Cuisenaire rods**

**F - Y8, Pedagogical Content Knowledge, Workshop  
Bernadette Mercieca, Australian Catholic University**

Cuisenaire rods have been around since the 1950's and many of you would have used them in primary school. They are currently enjoying a revival and are now a colourful and versatile tool to have in a primary Maths classroom. Join myself and two pre-service primary teachers from ACU to explore the wonderful learning and understanding of fractions that can occur in using the rods in this very practical, hands-on session. We will explore equivalent fractions and the four operations with the rods with applications to the mid to late primary school and early secondary classroom.

### **D07 Enhancing student voice through problem solving and inquiry**

**F - Y6, Context for Learning, Workshop, Repeat  
Nadia Walker, Aspendale Gardens Primary School**

Enhancing student voice in mathematics depends on a few key factors, including a classroom culture of problem solving and inquiry, honouring all student efforts, encouraging students to be partners in the learning and setting high expectations for engagement and ownership. This hands-on workshop will offer tasks, look at student work samples and videos, as well as provide guides and protocols to assist in setting up a classroom that honours student voice.

### **D08 Using Education Perfect to make connections in Maths**

**Y7 - Y10, Curriculum/Assessment, Workshop, Repeat/  
Commercial  
Jess Mikecz, Education Perfect**

Education Perfect is an online learning and assessment platform that contains a wide range of resources which have

been aligned to the Australian Curriculum. Teachers are able to easily create online assessments that can assess individual students or their class as a whole. These assessments can be used for pre-testing, formative assessment, revision tests and summative assessment. They are automatically marked for you and provide a snapshot of each student's level of ability at that point in time. From the detailed analysis that the system provides, teachers can make connections between student achievements and strategies to help improve areas of weakness or extend students further. This session will provide teachers with the skills to be able to create and administer effective assessments through the Education Perfect platform as well as dissect the detailed analysis provided to effectively differentiate their Maths classrooms. Welcome to bring own device (laptop, tablet, etc) and be logged on to EP during the session, but not essential.

### **D09 Challenging Maths tasks to promote student agency.**

**F - Y6, Context for Learning, Workshop  
Stacey Lamb, St. Bernard's Primary School Wangaratta**

Student agency allows students to have a level of autonomy and power in a learning environment. Learning and teaching beliefs, classroom environment and the choice of Mathematical tasks are paramount. Through the use of Challenging Maths Tasks learn how students have become independent self regulated learners in a primary setting.

### **D10 The Pedagogy of Picture Puzzles**

**Y3 - Y10, Pedagogical Content Knowledge, Workshop  
Douglas Williams, Mathematics Centre**

One screen, two learners, concrete materials and a challenge - that's at least three pedagogical decisions right there. Here's another one. Screens of choice for kids are more likely to be dominated by pictures than words. Maths education screens are often more symbols and words than pictures. However, Picture Puzzles have more pictures than words, multiple levels of content, encourage mathematical conversation and working mathematically. Mathematics that's concrete, visual and makes sense is presented in menus offering students choice. Explore Picture Puzzles from Mathematics Centre and learn to create your own. You will need a web-connected device which opens PDF.

### **D11 Recipe to develop VCE Mathematics SAC 101**

**Y11 - Y12, Curriculum/Assessment, Workshop, Repeat  
Echo Gu and Trevor Smith, Lauriston Girls' School**

Developing a School Assessed Coursework that meets

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

the requirements of VCAA assessment guideline could be challenging for teachers new to the subjects. This session aims to help shorten your preparation time when writing a SAC. We will highlight the key focus of outcomes specified in the Study Design, particularly the Unit 3 Application Task for Mathematical Methods and Specialist Mathematics. Upon the close examination of VCAA SAC audit report, a list of 'Dos' and 'Don'ts' will be suggested. In addition, a snapshot of publicly available resources will be discussed. You will gain a better insight into the VCAA audit requirements, and leave with more ideas that can be used as your SAC context in the future.

## D12 Challenging, coherent, cumulative experiences that engage all students

**F - Y6, Curriculum/Assessment, Lecture**  
**Peter Sullivan, Monash University**

This session will illustrate approaches to engaging all students by activating thinking through challenging tasks with learning consolidated by further tasks carefully varied. Participants will work through an illustrative learning sequence and discuss ways that pedagogies associated with such teaching can address learning needs of all students.

A similar session is available for Y7 - Y10 in the previous timeslot.

## D13 From additive to multiplicative thinking: Ideas for teaching

**F - Y8, Pedagogical Content Knowledge, Workshop**  
**Mayamiko Malola, Catherine Pearn and Max Stephens, The University of Melbourne**

Multiplicative thinking is a central pillar of mathematical learning in the primary and middle years. It forms the basis for understanding numerous topics such as proportions, patterns, ratios, fractions, and percentages. The development of algebraic thinking also relies on students having developed sound multiplicative thinking. However, the transition from additive thinking to multiplicative thinking is a challenge for many learners in the middle years. However, it is not a simple one-step process. This session will present teaching suggestions and several case studies demonstrating the challenge some learners encounter in transitioning from additive to multiplicative thinking, and how teachers can help students with this. This session will include practical activities and tasks to help move students progressively from additive to multiplicative thinking.

## D14 The Questioning Classroom

**Y5 - Y10, Context for Learning, Lecture, Repeat**  
**Mike Clapper, Australian Mathematics Trust**

Can we generalise...? What if...? What's the connection...? Could we...? These are the sorts of questions we would like our students to be asking. How can we promote a culture within our classroom which allows and promotes open-ended questioning and an exploratory spirit – and still get through the curriculum!

## D15 Curriculum that can connect every student

**Y5 - Y12, Curriculum/Assessment, Lecture, Repeat**  
**Steven Goldberg and Madeleine Graham, Prahran High School**

The opportunity to start something new is exciting and limitless. It gave us the freedom to connect the dots of a range of theories, techniques and technology. Here's what we've tried to achieve in our first year at Prahran High School:

- A system of learning that allows every student to progress at their own pace and take ownership of this process.
- An integration of technological solutions that maintains student-teacher interactions as the focal point of learning.
- A goal-setting and reflection mechanism that inclusively tracks growth.
- An explicit skill-building focus on problem-solving and core arithmetic..
- Assessment that is constant and transparent and reporting that authentically reflects student achievement.

## D16 Communicating sustainability using student-led statistical investigations

**Y5 - Y10, Curriculum/Assessment, Lecture**  
**Vaughan Barras and Michael Llewellyn, Donvale Christian College**

We present a methodology to help develop and utilise student-led statistical surveys to explore the maths curriculum and to communicate progress towards improved sustainable practice to the wider school community.

To acquaint students with the cycle of statistical investigation, a framework was devised to interact with the developing statistical skills of junior secondary students. As part of a broader school-wide goal to understand and improve biodiversity across the grounds, a series of spatial surveys was conducted to collect data on Eucalyptus species, ground cover, canopy and tree diameter.

We show that the ability to visualise the outcomes of surveys such as these have proven to be effective in accommodating multiple learning outcomes, assessing levels of student statistical reasoning as well as communicating goals and achievements in sustainable practice to the wider school community.

### D17 Academic integrity for maths tasks

#### Y11-Y12, Curriculum/Assessment, Workshop Katherine Seaton, La Trobe University

In this workshop, you will explore resources developed as part of a La Trobe University project *Don't cheat yourself: clarifying collusion confusion*, which focussed on educating students about academic integrity in the specific context of mathematics tasks. First, you will be introduced to what the literature says (and significantly doesn't say) about mathematical tasks. Then, we will get hands-on with the scenario-based resources which draw out a variety of issues around student understandings and motivations, as a means to educate and prevent (the two steps that should be taken before detection and penalty). The resources have recently been released as an open educational resource.

### D18 Motivating and Engaging Middle Secondary Learners

#### Y9 - Y10, Pedagogical Content Knowledge, Workshop Megan Steel and Jessica Carter, Kaniva College

Ask the majority of Year 9 and 10 students what they think of maths and what answers do you expect to get? It's boring. Why are we doing this? I don't get it. Textbook, textbook, textbook. In this session we will explore a number of ways of reengaging and motivating students across the mathematics curriculum and bring back the joy of mathematical exploration we often lose in secondary school. We utilise and consider the impact differentiated hands on activities, rich learning, growth mindset, enhancing student voice and making connections to the wider world. We will explore how to refocus the most disengaged mathematics students through varied instruction allowing all students experience success.

### D19 Victorian Curriculum Assessment and Curriculum Made Easy

#### F - Y10, Curriculum/Assessment, Lecture, Repeat/ Commercial Andrew Spitty, Essential Assessment

Essential Assessment provides an easy and affordable way for Victorian Primary and Secondary schools to deliver a consistent and whole school approach to Victorian Curriculum Numeracy and Literacy assessment and curriculum. Essential Assessment delivers a whole school approach to summative and formative assessment and delivers an online differentiated assessment and curriculum model aligned to the content descriptions of the Victorian Curriculum. Our online assessment program assesses and develops student knowledge within each proficiency strand while delivering a consistent approach to whole school data. Our online platform creates a differentiated online curriculum to progress each students understanding within each strand, sub-strand and topic of the Victorian Curriculum!

### D20 What makes a mathematical task rich?

#### Y5 - Y10, Pedagogical Content Knowledge, Workshop Michaela Epstein, MAV and RMIT University

Some mathematical tasks are richer than others. They inspire student curiosity, provide a balance of productive struggle and success, and enable students to have ownership of their learning. These are tasks that are accessible to all students and leave them hungry for more.

How can you easily identify what these tasks are? How do they fit into a balanced mathematics program? And how can you run them to ensure success for your students?

This session will include a mix of theory, pedagogical considerations as well as practical strategies for getting rich tasks up and running and sustaining them in your classroom.

### D21 Further Mathematics Exam - featuring efficient ClassPad use

#### Y11 - Y12, Curriculum/Assessment, Workshop, Repeat Elena Zema, Casio Education

This session will present approaches to the 2018 VCE Further Mathematics Examinations. These approaches will incorporate the use of CAS as well as 'manual' solution methods. At times, two alternative methods may/will be presented. The providing of two solutions is intended to encourage a conversation between teachers (and students) about the most discerning and efficient way to tackle the mathematics presented in this form of assessment. BYO technology of choice.

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

## D22 Linking explicit teaching to meta-cognition.

**F - Y8, Curriculum/Assessment, Workshop**  
**Michael Younger, Laura Boylan and Amanda Williams,**  
**Flemington Primary School**

We will be presenting the way in which Maths is delivered in an exemplar class at Flemington Primary School.

We will talk about the GANAG model and how goals are used at the beginning and end of lessons, and how each student works on a specific skill based on formative, ongoing assessments with a mixture of explicit teaching, multiple exposures and open ended tasks allowing students an opportunity to develop preferred strategies.

We will provide examples of metacognitive tools, methods of developing assessment rubrics, lesson structures and demonstrations of what explicit teaching of small groups looks like at our school and how this supports the independent practise of skills.

## D23 Place Value: Developing quality assessment items

**F - Y6, Curriculum/Assessment, Workshop**  
**Angela Rogers, RMIT University University**

Place value forms the building blocks of number, however it can be a difficult construct to accurately define and assess in the classroom. Currently many of the assessments used for whole number place value include questions which fail to expose common student misconceptions. These misconceptions include the face value misconception and independent column thinkers. This session will use the results of extensive research into assessment items for place value in Years 3-6, to explore the creation of quality assessment items. The results of the research will be presented and suggestions for improving both teaching and assessment of place value will be shared with participants. A framework for setting up a whole school approach place value based on 6 key aspects will be presented and a developmental progression will be shared. This session is suitable for teachers from Years 1-6 and Mathematics Leaders.

## D24 From sharing to ratios: It's all about proportions.

**Y5 - Y10, Pedagogical Content Knowledge, Workshop, Repeat**  
**Helen Booth and Leanne McMahon, Australian Mathematical Sciences Institute (AMSI)**

Understanding ratios and proportion and being able to reason proportionally are required skills in many STEM areas, yet

proportional reasoning is consistently highlighted as an area of difficulty for many students. Identified as one of the Big Ideas in Number (Siemon, Bleckly & Neal (2012)) and as one of the best indicators of student understanding of rational numbers (Lamon, (2012), developing proportional reasoning is important. How can we make the concepts involved in proportional reasoning more accessible to students? How do we incorporate practical, concrete models that move students through additive to abstract multiplicative thinking? This workshop will explore a variety of Pedagogical Content Knowledge that support the development of proportional reasoning, using hands-on and representational models to develop more efficient abstract strategies.

## D25 Edrolo for Mathematics: Data, Differentiation and Exam Preparation

**Y11 - Y12, Tools and Technology, Workshop, Repeat/ Commercial**  
**Liam Ferris and Mark Drummond, Edrolo**

Want to learn more about how to get the most out of Edrolo with your VCE Mathematics classes? Join us for this professional development workshop where we'll show you how to effectively use Edrolo for formative assessment and exam preparation. The workshop will include a deep-dive into using our scaffolded exam-style questions, student self-marking and accessing insightful data to guide teaching & learning in your classroom. You will also have the chance to collaborate with teachers from different schools to discuss approaches for integrating Edrolo into your Mathematics curriculum.

## D26 Algebra Tiles - A Lesson in the Unknown

**F - Y10, Pedagogical Content Knowledge, Workshop, Repeat**  
**Nadia Abdelal and Anna Bock, Australian Mathematical Sciences Institute (AMSI)**

Algebraic thinking in students is a crucial part of a mathematical journey that starts in the early years. In this workshop, we will use the Algebra Tiles manipulative tools to look at how we can develop these skills by supporting student understanding in the areas of number, multiplicative thinking and patterns and algebra. We will also look at how you can create algebra tiles for your classrooms to help your students develop a conceptual understanding of algebraic thinking and the concepts of algebra.



## D27 The Data Driven Teacher

### Y5 - Y12, Tools and Technology, Lecture, Commercial Craig Blake, Mathspace

There are overwhelming amounts of data available in education these days. The question is how to best use it.

Central to the data driven teacher is the ability to make informed decisions about individual students and the class' learning trajectory by responding to learning deficiencies in real-time.

In this session we will explore how Mathspace-generated data facilitates teaching. Insights will be shared on how obtaining data via Mathspace has reduced workload, improved what teachers understand about student progress and therefore enhanced student learning.

We will focus on:

- Diagnostic Reporting
- Student Progress Reporting

You will walk away with:

- Strategies for collecting meaningful data about learning
- Processes for assessing and analysing data
- A decision making framework for pivoting to adjust learning based on data results.

Devices are encouraged as there will be digital materials that will be used during the activities. Participants need no prior experience with Mathspace.

## D28 Keeping it real - Data, data and more data

### Y5 - Y10, STEM , Workshop, Repeat/Commercial John Widmer, Mag-Net Online STEM Educators Juan Ospina León, Teach for Australia

Society is changing with automation, technology and vast amounts of data being created at an incredible pace. Many jobs are changing or being created requiring STEM skills. The "TE" elements of this acronym are often misunderstood in education. The presenters of this hands-on workshop will show that an understanding of STEM should involve the development of skills including the development of basic algorithms to collect data, then clean, analyse and interpret (all skills in the Victorian and Australian Mathematics Curriculums). The presenters will share a variety of basic

data collection methods, but also share some interesting public available data sets to capture students' attention, and support them developing these crucial sets of skills. Finally, examples and discussions will be had of how this can fit into a mathematics continuum to align programming, probability and statistics with the other core skills of number/algebra that are the foundation of STEM.

## D29 Using Problem Solving to Create Differentiated Learning Experiences

### Y5 - Y8, Context for Learning, Workshop, Repeat Pauline Kohlhoff and Anne Prescott, Australasian Problem Solving Mathematical Olympiads (APSMO) Inc.

In this workshop, we will explore how a well constructed problem can be used for teaching students who are at different stages of mathematical development, and who may exhibit different levels of mathematical achievement and confidence in their own abilities.

Questions from the Australasian Problem Solving Mathematical Olympiads and Maths Games will be used as the basis for classroom activities for students in Years 5 to 8.

The aim is to support a variety of solution strategies and further mathematical inquiry, to enhance differentiation in the teaching and learning of mathematical concepts. APSMO Inc. is a not for profit organisation.

## D30 Creating mathematical engagement with Maths300

### F - Y6, Pedagogical Content Knowledge, Workshop, Repeat/Commercial Stephen McLeod and Laura O'Meara, Windsor Primary School

Maths 300 is an online resource providing teachers with engaging lessons that encourage creative and critical thinking. In this workshop we will explore a Maths 300 lesson and how the lessons inspire students to develop their use of the proficiencies as they develop maths concepts and progressions of learning. We will explore how we have used this resource to ensure consistent best practice across our school. Teachers will examine the elements of a Maths 300 lesson and investigate how it has the capacity to challenge students from F - 6 giving teachers the opportunity to make connections between the primary years along with cross-curricular learning. We will investigate a sequence of lessons and discuss how these can be implemented school wide to increase both student and teacher knowledge of the proficiencies.

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

## D31 Mathematical Methods: Probability enhanced with TI-Nspire

**Y11 - Y12, Tools and Technology, Workshop, Repeat**  
**Frank Moya, Educational Consultant**

Participants will explore creative ways of using TI-Nspire technology to enrich the teaching and learning of the Probability & Statistics area of study. In particular, dynamic features of TI-Nspire will be used to promote understanding of statistical inference for sample proportions. This will include setting up simulations to develop the idea of the sampling distribution and to give meaning to the concept of a confidence interval. Teachers will leave this session with resources that they can use or adapt in their classrooms.

## D32 Developing Further Mathematics SAC tasks

**Y11 - Y12, Curriculum/Assessment, Lecture, Repeat**  
**Kevin McMenamin Mentone Grammar**

The mathematics study design 2016 – 2020 requires an open and explorative approach to developing SAC material that ensures the tasks are application, modelling or

problem-solving in nature and not just an extended collection of Examination 2 questions. This session gives you the opportunity to explore starting points and create the skeletal

detail for the tasks you would use in 2020. We will look at a selection of application and modelling/problem solving starting points that will act as stimulus material to initiate discussion and then provide the focus of the investigations.

## D33 Parental Perceptions of NAPLAN: Who's Telling the Truth?

**F - Y10, Curriculum/Assessment, Workshop**  
**Linda Cranley and Gregory Hine, The University Of Notre Dame Australia**

Each year students in Years 3, 5, 7, 9 participate in the National Assessment Program – Literacy and Numeracy (NAPLAN). The NAPLAN results are reported nationally through the Summary and National Reports (ACARA, 2008), and an individual report is provided to parents and caregivers for each student. The high-stakes nature of NAPLAN has resulted in parents placing increasing importance on the NAPLAN results. In this session we will compare children's mathematics achievements in their school reports and the results reported in NAPLAN. We will also explore how teachers can address parents' concerns and the extent to which discrepancies between school reports and NAPLAN results in mathematics have affected the parent-school relationship.

## D34 Tips/resources for First Year VCE Mathematical Methods (Units 1 & 2) Teachers

**Y11 - Y12, Curriculum/Assessment, Workshop**  
**Ian Wong, Waverley Christian College**

This workshop is for teachers who are new to teaching VCE Mathematical Methods (Units 1 & 2). We will be giving a brief overview of the contents of the subject based on the current study design, followed by an explanation of the way we have structured the course for our students. Through sharing our experiences in teaching the subject, we hope to offer helpful tips on teaching, as well as advice on how to develop professionally. Furthermore, we will be sharing resources which we have gathered over the years that may be of benefit to you. Finally, we hope that this session will offer a networking opportunity for fellow colleagues who are embarking on the same journey.

## D35 Making Connections: Making maths planning easier

**Y5 - Y8, Curriculum/Assessment, Workshop, Repeat**  
**Jacinta Blencowe, Australian Mathematical Sciences Institute (AMSI)**

There are lots of connections within the curriculum which naturally fall together e.g. Area and multiplication. When we take advantage of these connections we can develop a curriculum plan that helps us to "fit everything in" and give context to student learning. Spiralling, or interleaving the curriculum, gives teachers and students the opportunity to revisit and build upon their learning.

Come and explore these concepts that can help make life easier for teachers. Play around with unit ideas that take advantage of the 'big ideas' in maths and leave with some inspirations to change the way you plan your teaching to cover the curriculum.

## D36 Chance, Data and the Gambling Issue

**Y9 - Y10, Context for Learning, Workshop, Repeat**  
**Robert Money**

Try out some realistic gambling simulations with an average return to player (equals price x probability) of always less than 95%. See how the longer you play the more certain you are of losing all your stake. Tease out common misunderstandings and confront them with the key message 'Chance has no memory'.

See how these simulations can be used as an engaging way of covering all the probability content of the Year 9/10 curriculum.

See how real gambling data – from the local pokies venue to the Australia-wide context – can be easily accessed by students for use in the calculation and representation learning activities of the Year 9/10 statistics curriculum.

Discuss effective ways of dealing with the gambling issue in Year 9/10 classrooms. Organise to get access to all the resources used in the session.

### D37 Lights, Music and the TI-Innovator

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Raymond Rozen, RMIT University University**  
**Shane Dempsey, Hamilton College**

The TI-Innovator Hub enables students to learn basic coding and design, and to use these skills to program and build working solutions and connect STEM concepts.

In this hands-on workshop beginners will be introduced to programming the TI-Innovator using TI-Nspire. We will make coloured lights come on and off and use proportional reasoning to write code that creates sounds and music on the TI-Innovator. Although no programming or music knowledge is required, however if you do it will be beneficial. TI-Innovators will be supplied but bring along your TI-Nspire or laptop to create these programs.

### D38 Wowed by Widgets – The Directors Cut

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Chris Ireson, Melbourne High School/Texas Instruments**  
**T<sup>3</sup> National Instructor and Len Bedier, Melbourne High School**

Come and see what everyone has been talking about!

“Wowed by Widgets” was a huge success at the Texas Instruments International Conference in Baltimore this year. TI-Nspire™ CX CAS widgets are easy to create and can be a powerful teaching and learning tool. Teachers can use widgets to help demonstrate mathematical concepts and principles. Students can use them to efficiently explore what-if type scenarios and pre-prepare their own for assessment tasks. In this workshop, a series of tried-and-tested widgets will be provided to participants. There will be a discussion about widget construction and content, and participants will build and save their own widgets. No prior widget experience assumed.

It would be an advantage to bring your laptop to the session with the TI-Nspire™ CX CAS Teacher Version 4.5 Software or TI-Nspire™ CX CAS Premium Teacher Version 5.0 Software installed, otherwise bring your TI-Nspire™ CX or CX II CAS Calculator. *Note: The Casio ClassPad is not suitable for the session.*

### D39 Sparking interest and engagement in the secondary classroom

**Y7 - Y10, Context for Learning, Lecture, Repeat/ Commercial**

**Vanessa Rule-Paddle and Tim Carruthers, Pearson**

This session explores ideas for chapter starter activities and lesson learning activities that are designed to engage middle years' learners. Chapter starters which are intriguing, inspire students to ask questions, are visually stimulating and are linked to the real world have the potential to create meaning around why we study maths. Similarly, learning activities that are contextualised and help to develop conceptual understanding are a great way to maintain student engagement. While this session is focused on years 7-10 mathematics, the pedagogy explored is applicable to other year levels.

### D40 Improve Lesson planning and student engagement while saving time

**Y7 - Y12, Tools and Technology, Lecture, Repeat/ Commercial**

**Bill Murray, Mentone Girls Secondary College**

Improve lesson planning and student engagement while saving time.

The cloud-based Classroom Organiser planning and student tracking system enables teachers to prepare and document individual topic/lesson plans in an easy to use file. This process streamlines planning by operating in a realistic manner that teachers recognize and understand (this is a considerable time saving for teachers)

The system encourages teacher/student collaboration in setting a differentiated learning plan to meet individual student needs and assists self-paced learning by enabling students to work through various levels of achievement. It provides easy access to lesson plans encouraging collaboration and real time discussion between teachers and students.

The system tracks student progress in real time (indicative not prescriptive) and communicates assessments to students and parents (using separate logins) within a few days of task completion.

# SESSION D-E, Thursday, 2.30pm-4.40pm

## D-E01 Embedding Active Pedagogy into Teacher Education targeting Mathematics: Transform-Ed!

**F - Y6, Networks as Communities of Practice, Workshop, Repeat**  
**Paul Dann, Introducing Mathematics**

Low levels of physical activity and high levels of sedentary behaviour are widespread public health issues, pervasive in schools. Teacher education is pivotal to school and educational reform, but an under-studied setting for physical activity and sedentary behaviour research. The overarching aim of this research (Transform-ED!) is to investigate the impact of incorporating an evidence-based active pedagogy targeting Maths education, on the teachers' capacity to increase children's physical activity, reduce sitting time and improve academic-related outcomes.

This workshop aims to provide an insight into evidence and findings around Transform-ED! as well as a comprehensive and interactive practical application of the active pedagogy used in the maths unit.

Although the session is focused on the Primary Years curriculum, it would be suitable for all maths educators as it will provide innovative, dynamic and evidenced-based activities and resources that could be used in primary, secondary or tertiary maths education.

## D-E02 Making Probability accessible for all students

**Y7 - Y10, Pedagogical Content Knowledge, Workshop**  
**Narcisa Corcaci, Werribee Secondary College**

What makes our students afraid of Probability? Is it the probability language that they fear? Are the tools used so difficult to grasp? Or maybe the concepts are the real reason of dread? In this workshop we will explore the connection between language, tools and concepts. We will be looking at the similarities and differences between the probability tools mostly used: Venn Diagrams, Two-way tables and Probability Trees. We will be unpacking the probability curriculum level 7-10 while replacing one probability tool with another. This workshop will also provide ways to cover probability topics starting with a simple question and little preparation.

## D-E03 Masterclass: Supporting leaders in their first years of leading

**F - Y6, Pedagogical Content Knowledge, Workshop**  
**Ellen Corovic, The Mathematical Association of Victoria**  
**Aimee Fleming, St Albans North Primary School**

Leading school improvement is a messy business and can feel overwhelming at times. In this session, teachers will explore common issues faced by those new to leadership and will be guided through identifying effective practices and tools that will support both themselves as leaders and the teachers in their schools. Building effective teacher resource numerary kits, providing feedback to peers, finding your space among whole school priorities and developing team and school goals (more than just the AIP) are some of the themes we will discuss. This special masterclass session will provide advice and support for teachers who are in their first few years of being appointed as a leader. Aspiring leaders may also find this session useful.

Teachers should bring with them copies of their annual implementation plan, strategic plan or similar documents.

## D-E04 Masterclass: Supporting leaders in their first years of leading (a secondary focus)

**Y7 - Y12, Curriculum/Assessment, Workshop**  
**Helen Haralambous and Danijela Draskovic, The Mathematical Association of Victoria**

Congratulations you've just been appointed Maths Coordinator or Leading Teacher! Where to start? Managing all the different aspects of the role and varying personnel can all be overwhelming at times. In this session, teachers will explore common issues faced by those new to leadership and will be guided through identifying effective practices and tools that will support both themselves as leaders and the teachers in their schools. Leading an effective team, finding your space among whole school priorities, developing team and school goals (beyond the AIP) through effective meetings, providing feedback to peers and of course building effective teacher resource kits are some of the themes we will discuss. This special masterclass session will provide advice and support for secondary teachers who are in their first few years of being appointed as a leader. Aspiring leaders may also find this session useful.

## D-E05 Avoiding the RHS

**Y7 - Y12, Tools and Technology, Workshop, Commercial  
Peter Fox, Texas Instruments**

A level of repetition is important to reduce cognitive overload, however, we can avoid the Right Hand Side and go straight to mathematical modelling to help provide memorable and meaningful learning experiences for students. Linear, quadratic, sinusoidal, exponential and more, there are so many opportunities to generate and generalise. Participants in this workshop will be able to explore a range of activities and investigations suitable for students from Years 7 to 12. BYO TI-Nspire calculator.

## D-E06 Critical connections between language, literacy, mathematics and numeracy

**Y5 - Y10, Pedagogical Content Knowledge, Workshop,  
Dave Tout, Australian Council for Educational Research  
(ACER)**

Why do teachers of numeracy and mathematics also need to be language and literacy teachers? This presentation and hands-on workshop will look at issues related to the relationship between numeracy and mathematics, and the crucial roles that language and literacy play in the teaching and learning of both mathematics and numeracy. Based on this analysis, what are some of the key challenges in how to teach numeracy and mathematics successfully taking the language aspect on board, and what are some teaching strategies and approaches that support and integrate the language of mathematics into our classroom practices. A range of different hands-on activities and strategies will be demonstrated that can be used in your classrooms.

## D-E07 Formative Assessment with Mobile Devices in Mathematics Classroom

**Y7 - Y12, Tools and Technology, Workshop, Repeat  
Irina Lyublinskaya, Teachers College, Columbia University**

In this interactive session you will learn about various ways mobile technology can be used to support students' mathematics learning through free APPs and internet-based tools for mobile devices. Bring your own mobile device.



# SESSION E, Thursday, 3.40pm-4.40pm

## E01 Reflection and Metacognition in The Mathematics Classroom

**F - Y10, Tools and Technology, Workshop, Repeat/ Commercial**  
**Genovieve Grouios, Consultant**

The great mathematician of the nineteenth century, Carl Friedrich Gauss recorded his key discoveries and thoughts through a mathematical diary. Within each entry, he engaged in critical reflection and mathematical discourse with himself, leading to new ideas which challenged many mathematicians of his time and thereafter. In Australian Mathematics Central (AMC), students can use the Number Diary, to discover the power of writing in mathematics. Here, they will discover the connections between language and mathematics and can begin to engage in metacognitive tasks, which encourage them to look beyond summarising an activity and move towards questioning, goal setting and dialogue. This session will also introduce teachers to various resources available to them such as: professional learning videos linked to the curriculum strands, ideas on how to use guiding questions to stimulate thinking and discussion, formative assessment and ways to introduce key mathematical language and definitions. iPad or Laptop needed.

## E02 Worthwhile CAS calculator use in this year's Mathematical Methods Exam 2

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Kevin McMenamin, Mentone Grammar**

Routine and clever use of the CAS calculator in past Methods 2 examinations has shown it to be advantageous and worth the time and effort in getting to know its workings. Generally, half of the multiple choice questions and many parts of the

extended answer questions benefit from good calculator skills. This hands-on session will get you using the calculator to see just how helpful (or not) it was with this year's questions. The most efficient methods will be presented and questions where the calculator should be avoided will be pointed out.

The session is suitable for TI-Nspire and ClassPad users and the Casio ClassPad will be the featured CAS. Bring along your CAS calculator and a copy of the exam if available.

## E03 Addressing misconceptions about mass and volume/capacity

**F - Y8, Curriculum/Assessment, Workshop**  
**Heather McMaster, University of Sydney**

There appears to be much confusion amongst both teachers and students about the concepts of mass and volume/

capacity and how they can be measured. A common belief, for example, is that grams/kilograms are always the units for solids, and litres/millilitres are always the units for liquids. Another common misconception is that knowing a cubic centimetre equates to a millilitre, people think that one millilitre equates to one gram. In this workshop you will be introduced to a couple of simple hands-on tasks and discuss how they might be used to reveal your students' thinking and reasoning about mass and volume/capacity.

## E04 Producing brilliant mathematical diagrams

**Y7 - Y12, Tools and Technology, Lecture, Repeat/ Commercial**  
**Geoff Phillips and Ann Phillips, Geoff Phillips Publications**

Learn how to use a powerful, free vector graphics program to produce virtually any type of mathematical diagram or graph with full control over every element. Diagrams may be copied into Word or converted directly to pdf. Your worksheets and tests will look sharper than ever! No need to bring a computer, as the session will be filled with examples and instruction in preparation for later use.

## E05 Mathematical Investigations for the new VCE Structure

**Y11 - Y12, Curriculum/Assessment, Workshop**  
**Brian Lannen, Wodonga TAFE**

Several curriculum models are currently being considered for the structure of VCE Mathematics for the next decade. The notion of "Mathematical Investigation" is mentioned in a couple of these. Exactly what does this mean and how could we shape it? This workshop examines what may and may not be desirable in mathematical investigation, whether it be a process or a project. Various resource gateways will be shared, along with a few specific projects that could have a curriculum fit as part of either the calculus or non-calculus VCE courses. Bring TI-Nspire CX (CAS) calculator (or equivalent).

## E06 When is a square a triangle?

**Y9 - Y12, Pedagogical Content Knowledge, Lecture**  
**Chris Wetherell, Australian Maths Trust / St Francis Xavier College / ANU Extension**

The number 36 has the remarkable property that it is both square and triangular, since it equals  $6 \times 6$  and  $1+2+3+\dots+8$ . That is, a  $6 \times 6$  array of dots can be perfectly rearranged into a triangular stack with 8 dots on the bottom row. Apart from the trivial case of the number 1, which is regarded as both square and triangular by convention, are there any other numbers with this property? It turns out that this talk on geometric

properties of whole numbers is really about fractions, quadratic equations, surds, approximation, sequences and matrices, with a few passing references to calculus and algorithms thrown in for good measure. Links will be made between these concepts from the Australian Curriculum and key ideas from the ANU Extension course for Year 11/12 students and the Australian Maths Trust's Olympiad program.

### **E07 Interesting Physics Applications for Methods & Specialist SACs**

**Y11 - Y12, Context for Learning, Lecture, Repeat**  
**Wayne Semmens, Al Siraat College**

CAS calculators provide accessibility to physics applications for use in VCE Methods & Specialist SACs.

This session will review a Year 12 Methods Application Task which involves modelling solutions of the Damped Harmonic Oscillator to minimise the impact of Earthquakes on buildings.

This session will use products of exponential and trigonometric functions, tangent lines, average rate of change and average value to investigate parameters which minimise the impact of Earthquakes on buildings. No physics knowledge will be required.

CAS calculator or software required.

### **E08 Preparing students for external exams, what's QLD doing?**

**Y9 - Y12, Context for Learning, Workshop**  
**Antje Leigh-Lancaster and Julian Lumb, Pearson**

2021 will see QLD maths students sitting external QCAA set Year 12 exams for the first time in over 45 years. Having grown up in VIC, where sitting exams that require a whole year's knowledge has been considered the norm, it's been interesting to observe the strategies HODs and teachers are putting into place to help prepare their students for this change.

This session will provide an overview of current, relevant learning theory, and share ways teachers are using this material to support their students with the retention and retrieval of information. These strategies benefit all learners, in particular VCE students' preparing for final examinations.

### **E09 Team Teaching & Student Advocacy**

**Y7 - Y10, Context for Learning, Workshop, Repeat**  
**Simon Pitaro and Natalie Raspudic, St Bernards College**

Learn how mathematics at SBC changed from a teacher centered text book driven one size fits all experience to a

personalised student-centered rich learning environment. By using team teaching, flexible classroom spaces and expertise from the academic world, St Bernard's College has transformed learning. In this session you will learn about the general lesson structure and what rich tasks look like and how you can create your own.

### **E10 Developing Number Sense P-2**

**F - Y4, Pedagogical Content Knowledge, Workshop, Repeat**  
**Kerri Smith, Fish Creek and District Primary School**

Students in the senior primary grades who struggle with Maths often lack number sense. This session will focus on exploring the four crucial aspects of number sense that students in the early years of school need to develop to become competent mathematicians, namely: subitising small quantities, recognising 1 and 2 more/less, benchmarking quantities using 5s, 10s and 50s and exploring the part/part/whole relationship between numbers. We will then look at a variety of ways to engage students in learning these skills in a fun and engaging way. Links will be made to the mathematical proficiencies with lots of take-away ideas that can be easily adapted to accommodate different levels of ability. Participants will get a PDF with the games included, ready to use.

### **E11 Demonstrating tricky concepts in VCE Maths using Desmos**

**Y11 - Y12, Tools and Technology, Lecture,**  
**Bryn Humberstone, Brighton Grammar School**

Many Maths teachers know the Desmos Graphing Calculator as a useful tool for quickly plotting or exploring graphs in the classroom. Over the past five years as features have been added, it has become an increasingly powerful part of a VCE Maths teacher's toolkit.

Statistical functions allow teachers to demonstrate tricky areas of study from Maths Methods and Specialist Maths including important ideas of probability distributions and sampling, as well as working with bivariate data in Further Mathematics (finding lines of best fit and linearisation). I will show how these can be used for visualisations in the classroom, as well as how Desmos can help in demonstrating transformations and parametrised function families which feature heavily in the Maths Methods course.

No prior experience with Desmos is required, although you might want to bring along a computer or tablet to experiment.

## E12 Making Mathematical Memories - The big ideas behind teaching

**Y7 - Y12, Curriculum/Assessment , Lecture,**  
**Zoe Schaffner and Aline MacDonald, Brighton Grammar School**

Do you ever attempt the weekly newspaper quiz? If so, you are (unknowingly) engaging in retrieval practice, interleaving and spacing, the foundation of the work we do in the Brighton Grammar Mathematics department.

Our main goal in teaching is to achieve long-term retention of the content we deliver and subconsciously, the majority of teachers understand and aim to implement the cognitive science behind “making it stick”, but struggle to articulate what exactly we are doing. At Brighton Grammar our Year 7 to 12 students routinely engage in the retrieval practice as well as interleaving and spacing their revision to maximise performance.

We will talk about how we construct, administer and reflect on the strategies based on these key principles, and how it benefits our students.

Please bring a device, no other experience required.

## E13 Student-Centred Coaching in Mathematics

**F - Y12, Curriculum/Assessment , Workshop**  
**Kate Lachmund and Daniel Nadjidai, Tarneit P-9 College**

Learn how to embed student-centred coaching to help improve student outcomes and build teacher capacity. Daniel and Kate will present a researched based to model to provide opportunities to build a culture of feedback and embed quality practice with a systematic approach to data. They will walk you through a coaching cycle and discuss the benefits and positive impact coaching has on student success. They will highlight the coaching process, coaching conversations, collection of student data to inform a student-centered goal. They will share strategies that they use when working with teachers that will support the students to achieve improved learning outcomes.

## E14 Rock N Rover

**Y5 - Y10, STEM, Workshop, Commercial**  
**Jody Crothers, Ridge View Secondary College**

The TI-Rover Rocks out. The Ti-Rover cleans up an undersea rubbish dump, with students determining an optimal solution for the task. Then the Rover goes wild taking out anything in its path, watch out Godzilla, Rover is in town. We will be using the TI-Rover and TI-CX CAS calculators.

## E15 Function Junction – Exploring functions, graphing and coordinate geometry

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Roger Wander, The University of Melbourne**

What happens when the graphs of linear and quadratic functions share the same axis intercepts? In this hands-on workshop, we'll use TI-Nspire CAS Navigator technology to explore multiple representations of functions, specifically the regions created near Function Junction. Estimation, ratios, function notation, algebra and calculus ideas will be covered. We'll discuss ways you can frame your pedagogy to maintain interest and promote deeper learning for students as our findings are generalised. We'll have rulers, graph paper and calculators for those who haven't brought their own, and all files used will be available to participants. Ideally suited for teachers new to teaching Year 11 VCE Mathematical Methods using CAS.

TI-Nspire CAS CX calculators will be used and made available for participants without their own, and those with other CAS technologies will find the activity suitable for them as well. Nspire V4.5 will be used.

## E16 Big Mathematical Ideas from Computing

**Y9 - Y12, STEM, Workshop, Repeat**  
**Kaye Stacey, The University of Melbourne**

Digital technology is having an enormous impact on how mathematics is done. It is greatly widening the fields of application of mathematics, making it more important than ever in science, business, government and even the entertainment industry. There are new possibilities for data visualisation. Simulation of many types of behaviour supplements formula-based mathematical modelling. Simple rules have been shown to underlie many of the complex patterns in nature.

The session will illustrate these ideas with highlights from three “Mathematics and Algorithmic Thinking” units for Years 9 – 11. These are freely available from the reSolve project ([www.resolve.edu.au](http://www.resolve.edu.au)). These classroom-ready units show students how computer-based mathematics complements, extends, and enriches traditional mathematical methods. Many real world examples from science, society, art, etc. are encountered.

Highlights from three units will be demonstrated. Participants who wish to follow along with their own computers should download the students' Jupyter notebooks “Mathematics and Algorithmic Thinking” units from [www.resolve.edu.au](http://www.resolve.edu.au). The “Teacher's Guide” in the package includes instructions on how

to install the required software for off-line use. Participants who will have personal internet access could use the cloud version instead.

### **E17 Mathematics and Mathematical Literacy solution strategies; Teachers comments**

#### **Y11 - Y12, Context for Learning, Lecture France Machaba, University of South Africa**

This paper emerges from an analysis of learners' responses to tasks presented to learners studying Mathematics and Mathematical Literacy in South Africa. Officially, Mathematics and Mathematical Literacy are two separate learning areas. Learners from Grade 10 onward take either one or the other but not both. This means that there is a potential that by the time learners reach Grade 11, they would have acquired different kinds of knowledge and problem solving skills depending on which of these they take. This paper, therefore, attempt to explore the following question? What are teachers and facilitators' views on Mathematics and Mathematical Literacy learners' solution strategies?

### **E18 Balancing Being Open, Challenging and Explicit**

#### **F - Y6, Pedagogical Content Knowledge, Workshop Michael Bairstow, St Francis of Assisi**

As teachers we are asked to use open and challenging tasks, be more of a facilitator of learning, to promote productive struggle and encourage students to make connections and reach understandings for themselves. This is a major shift for lots of teachers and prompts many questions.

“How does explicit teaching and practice of skills and strategies fit alongside challenging tasks?”

“How much information and support should I be providing students?”

“What about teacher focus groups and modelling?”

“How do I get a good balance between struggle and challenge and explicit teaching and practice?”

All these questions will be explored in this session to support teachers in developing a better understanding of how we can better balance supporting students while still giving students the chance to deepen their own understandings and make connections for themselves.

### **E19 Flipped learning - a mathematics experience for Year 9 boys**

#### **Y9 - Y10, Tools and Technology, Workshop Penelope Kalogeropoulos, Monash University Angela Liyanage, Salesian College**

Flipped learning is a pedagogical approach in which the conventional notion of classroom-based learning is inverted, so that students are introduced to the learning material before class, with classroom time then being used to deepen understanding through discussion with peers and problem-solving activities facilitated by teachers. This innovative pedagogical approach was implemented in mathematics lessons for a year nine class of all boys at a school in metropolitan Melbourne. Since the students are introduced to the content prior to the mathematics lesson, the classroom activities focus more on collaborative and tactile activities. Feedback from students towards this teaching approach has been positive, explaining that they value the 'introduction' and 'review' of mathematical content that is readily available to them in a video form. The engagement of the students in the classroom has increased as well as their independence with their mathematics learning.

### **E20 Exploring students' mathematical reasoning through horizon problems**

#### **F - Y8, Context for Learning, Workshop, Repeat Dianne Siemon, RMIT University University**

Teacher knowledge about how mathematical ideas introduced at later stages in the curriculum are connected to ideas and strategies at earlier levels has been identified as mathematical knowledge at the horizon by Deborah Ball and others. Evidence from large scale studies suggests that students at earlier levels can tackle problems that would normally be considered appropriate for students at more advanced levels of schooling, for example, Year 4 students can solve simple proportional reasoning problems and problems involving the Cartesian Product. I've used the term horizon problems to refer to such problems as they provide windows into students' mathematical reasoning that we might not be aware of otherwise. While horizon problems may be solved using familiar strategies (e.g., make-all-count-all), it is their representations that can provide valuable opportunities for making connections and noticing mathematical relationships. This seminar will explore the possibilities afforded by a range of horizon problems.

## E21 Mathematical Ideas in the Game of SET

**Y7 - Y12, Context for Learning, Workshop, Repeat**  
**Amie Albrecht, University of South Australia**

SET is a game that is more than just fun to play. Each card shows a design with four attributes. A SET is a group of three cards where each attribute is either the same or different across all cards. Along with encouraging logical and spatial reasoning skills, SET inspires many mathematical questions from players of all levels – from primary students to research mathematicians. Mathematical ideas in SET include counting and combinatorics, probability, geometry, modular arithmetic, vectors and linear algebra.

In this workshop we'll experience the mathematical thinking needed when exploring the game. We'll uncover just a few of the mathematical ideas in SET, which are adaptable to a range of year levels, and hopefully pique your interest for further exploration. No previous experience with SET is necessary.

## E22 Really different Number and Geometry Activities ... yes really!!

**Y5 - Y8, Context for Learning, Workshop, Repeat**  
**Ian Bull, St Kevin's College**

Numbers are around us all the time. ISBN numbers in books as well as numbers used by scanners in supermarkets ... but how do they work? Come and find out ... the students in my mathematics classes know.

So you thought that the current Guinness World Record for folding a piece of paper was seven folds ... huh!! Come and find out what this has to do with mathematics.

If you bring a USB memory stick I'll give you the lessons as PowerPoint and Word files for free.

## E23 La Trobe Bendigo's new maths enhancement program

**Y7 - Y12, Networks as Communities of Practice, Workshop, Repeat**  
**Michael Payne and Toen Castle, La Trobe University**

La Trobe University's Bendigo campus has a small contingent of mathematicians teaching students from Science, Education, Engineering and IT. Most of our students are from the Bendigo region, and we are keenly aware of the historical decline in numbers of local high school students taking advanced maths subjects in the VCE. For this reason, we have started an extracurricular problem solving program for motivated students. As well as stimulating interest in maths,

our aim is to let students experience the same excitement of discovery that we do in our research. Problem solving as an exploratory learning activity seems a much better model of "doing research" than traditional content plus assessment based pedagogy. In this session we will discuss our experiences running the program and give a hands on demonstration of how we guide students as they tackle the problems. Bring your pencils and paper!

## E24 Rich Tasks that Challenge our Learners to Think

**Y5 - Y6, Context for Learning, Workshop**  
**Catherine Epstein, St Peter's East Bentleigh**  
**Martin Holt, Consultant**

Rich tasks have a range of characteristics that together offer opportunities to meet the different needs of learners. On its own a task is not rich, it is how the task is used in the classroom that may make it rich. ... challenge learners to think for themselves. Nrich.org

Come and explore a few Engaging Rich Tasks and consider how each can be differentiated to challenge all your learners to think.

## E25 Using teacher feedback to shape product direction

**Y5 - Y12, Networks as Communities of Practice, Lecture, Repeat**  
**Andrew Crisp, Mathspace**

Mathspace content is currently undergoing its most significant rework since its inception. Guided by our teacher and student feedback, we have learned what hasn't been working, and what works best. From high-level restructuring of coursework to individual question overhaul and visual redesign, we have improved every aspect of the Mathspace experience - for students and teachers alike. We are very excited to show you what we have learned and what changes are in store!

## E26 Complex Numbers, Polynomial Equations and Polygons

**Y11 - Y12, Tools and Technology, Workshop**  
**Yew Fook Chan, Saint Joseph's Institution**

Participants will experience learning activities to enable students to make connections between the Fundamental Theorem of Algebra, De Moivre's Theorem and the geometry of polygons. The presenter will also share how to incorporate some functionalities of TI-Nspire CX CAS to create the learning activities. Participants should have access to either a TI-Nspire CX CAS calculator or software.



## E27 Enhance Your Teaching with OneNote

**Y7 - Y12, Tools and Technology, Workshop, Repeat**  
**Ashley Carlton and Scott Alder, Hale School**

In this session we will share our tips and strategies for using OneNote to teach Maths more effectively and save you time on lesson preparation, checking homework and sharing resources. Our Maths teachers use OneNote to share lessons, teach in class, deliver content to students and embed learning tasks. See how we have revolutionised our classrooms and enhanced our teaching with Flipped-learning, interactive activities and easy-to-share lessons. OneNote is free to download on any device. A device with OneNote installed may be useful but is not required.

## E28 Journaling in Mathematics education

**Y7 - Y12, Curriculum/Assessment, Workshop, Repeat**  
**Peter Breukers, Wangaratta High School**

This session will explore how you can utilise the tenets of formative assessment in Secondary Mathematics teaching in order to foster an environment of growth. I will show a classroom where learning is becoming a priority and we try, as much as possible, to remove frequent, summative testing from the Mathematics curriculum. This is being done through a combination of journaling, metacognitive activities, and structured investigations, which provide a greater emphasis on skills and processes rather than outcomes. I will also share some successes and struggles that I have come across as well as some of the reasons and research behind this approach.

## E29 Real trigonometry with real time, real world data

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Enzo Vozzo, Mentone Grammar**

Using real time data from the App “Flightradar24” to calculate and confirm that the speed and track of a flight is 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. Delegates will practice with each of these methods either on their calculators or on a spreadsheet.

Delegates will require the app “Flightradar24” and the real time data from flights. Calculations will be done with a calculator or preferably a spreadsheet such as Excel.

## E30 Top Tips to Accelerate Learning

**F - Y6, Curriculum/Assessment, Workshop, Repeat**  
**Ian Stevens, Maths Adventures Ltd**

This workshop looks at practical tips to accelerate student learning. The complexity, wide range of abilities and competing demands in classrooms makes this very challenging, however there are research based and classroom tested ideas that can turn strugglers into successful, actively involved and positive students. This workshop rejects the idea that some students cannot learn maths.

We will explore a range of activities, rich tasks, and resources during the workshop that you can use next week. Both hands on and digital resources will be explored as well as looking at how technology can be used to support accelerated learning. This workshop is about accelerating students learning within classrooms. Accelerating conceptual understanding and the ability to use the maths they learn, at the same time as developing essential 21st Century competencies.

## E31 Kids - hate to estimate

**F - Y6, Curriculum/Assessment, Workshop**  
**Jennifer Bowden, The Mathematical Association of Victoria**

Kids hate to estimate! Why do the same problem twice! Estimate is an essential skill in developing understanding in many aspects of mathematics. In this workshop we will explore a range of activities that utilize estimation in creative and critical ways, connecting estimation with various elements of the Victorian Curriculum. Estimation and approximating can be used in a variety of ways from warmups, challenging tasks to assessment. A variety of activities and resources will be provided to investigate and use to plan a sequence of learning. Your students will start to love to estimate and love the challenge of using it to become more critical and creative in their learning.

## E32 Small Shifts, Big Gains

**Y7 - Y10, Curriculum/Assessment, Workshop, Repeat**  
**Deb Carmichael and Karen Milkins-Hendry, Independent Schools Victoria**

‘... most teachers plan their lessons as if they’re going to go perfectly and we suddenly find that no lesson plan survives the first contact with real children.’

Dylan William, Teacher Magazine Podcast, March 2019.

When and how do you check in with students to know whether to rewind, regroup, move on or pause? How reliable is the evidence you are collecting and how are you using it to plan your next steps? In this workshop we will explore the power of checkpoints and provide some take away tools to build responsiveness into your lesson plans and enhance student learning.

### E33 Mathematical Methods: Probability enhanced with TI-Nspire

**Y11 - Y12, Tools and Technology, Workshop, Repeat**  
**Frank Moya, Educational Consultant**

Participants will explore creative ways of using TI-Nspire technology to enrich the teaching and learning of the Probability & Statistics area of study. In particular, dynamic features of TI-Nspire will be used to promote understanding of statistical inference for sample proportions. This will include setting up simulations to develop the idea of the sampling distribution and to give meaning to the concept of a confidence interval. Teachers will leave this session with resources that they can use or adapt in their classrooms.

### E34 Learning Algebra With Picture Puzzles

**Y4 - Y10, Tools and Technology, Workshop**  
**Douglas Williams, Mathematics Centre**

Picture Puzzles use one screen, two learners, concrete materials and a challenge. Like a mathematician, the work begins with an interesting problem. The resulting mathematics learning is concrete, visual and makes sense. Each puzzle can guide a whole class investigation or be offered in a menu from which students choose their own investigation. The workshop will explore both ways and you will learn to create your own puzzles. This resource is not intended to embody the entire algebra course, but it will add variety to your current approach. You will need a web-connected device which opens PDF.

### E35 Teaching with Algebra Tiles

**Y5 - Y10, Pedagogical Content Knowledge, Workshop,**  
**Michael O'Reilly and Norrian Rundle, Norrian Michael**  
**Maths Education**

'Algebra Tiles' are a hands-on teaching aid used to introduce and teach Middle Years students the four operations using integers, as well as simplification, expansion & factorisation of linear and quadratic expressions. Teaching strategies will be explained throughout the session. We will also provide templates to cheaply make your own sets of 'Algebra Tiles'. We will be developing the ideas firstly with integers, and then

moving on to algebraic simplification, expansion and then factorisation. The use of arrays with the algebra tiles build on the initial work with integers.

### E36 Lights, Music and the TI-Innovator

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Raymond Rozen, RMIT University University**  
**Shane Dempsey, Hamilton College**

The TI-Innovator Hub enables students to learn basic coding and design, and to use these skills to program and build working solutions and connect STEM concepts.

In this hands-on workshop beginners will be introduced to programming the TI-Innovator using TI-Nspire. We will make coloured lights come on and off and use proportional reasoning to write code that creates sounds and music on the TI-Innovator. Although no programming or music knowledge is required, however if you do it will be beneficial. TI-Innovators will be supplied but bring along your TI-Nspire or laptop to create these programs.

### E37 Investigating Complex Numbers Using Series

**Y11 - Y12, Pedagogical Content Knowledge, Workshop,**  
**Repeat**  
**Ray Williams and Katie Bye, St Marks Anglican**  
**Community School**

We know that geometric series can be summed to infinity if the magnitude of the ratio is less than 1.

This activity looks at the behaviour of complex numbers under multiplication and explores the behaviour of summing the series for the three cases where the magnitude of the complex number =1, <1, or >1

### E38 Bringing VCE Maths to Life with TI-Nspire

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Stephen Crouch, Frankston High School - VCE Campus**

This session will explore how the TI-Nspire (software and/or handheld) can be used to create dynamic representations/ interactivities which give tough concepts in VCE Maths a new life beyond the static images drawn on the whiteboard. Learn how to create content that will "Make Connections" and mesmerise your students (and colleagues)!

Topics that will be covered include:

- Unit Circle interactivities (including graphs of sin, cos tan)
- Dynamic representations of the derivative (including first principles)

- Optimisation and Calculus
- Visualising Volumes of Revolution

Whilst the presentation will focus on using the Student or Teacher versions of the TI-Nspire platform, it is possible to use the CX CAS handheld for this purpose, though the software is much more efficient to use.

### E39 Wolfram Language coding introduction, challenging tasks, formative assessment

#### Y5 - Y12, Tools and Technology, Workshop, Repeat Ian Willson

The Wolfram Language and Mathematica software can contribute enormously to the development of both mathematical competence and coding skills. This can occur at the intersection of challenging Mathematical tasks, coding, exploration, discovery, collaboration and formative assessment. This workshop will reference all of these elements as they inform and underpin a set of introductory Wolfram Language activities designed to teach basic coding syntax using Graphics primitives, directives and options for design and creation. Participants will engage in a series of classroom-type learning activities with hand-out tasks. Suitable for all levels, both secondary and primary, it's an introduction to a mighty powerful coding language.

### E40 Using Computers in a Maths Classroom with Year 11/12+ Students

#### Y11 - Y12, Tools and Technology, Lecture, Repeat/ Commercial Robert Rook, Mathplot

This session will run through using technology in the classroom for Years 11/12+.

Among the topics covered are graphing, calculus, consumer maths, complex numbers, distributions, functions, parametric and polar graphs, regression, statistics (junior & senior), modelling data, trigonometry, probability and vectors to name a few.

Generation of various 2D and 3D equations including above topics plus 3D planes, surfaces, tori, knots, solids of revolution.

Use of the senior worksheet generator (Year 12), topic revision/test program, homework book generator will be explained. Questions are randomly generated giving an infinite number of questions with not only answers but full solutions available for questions.

Questions can be attempted at the computer and at home and results saved for progress to be observed. Questions can be emailed to teachers.

All attendees will receive a free registered copy of the latest software to take home and load on their home computers. Download from [www.mathplotplus.com](http://www.mathplotplus.com)

### E41 Calendars, clocks and sundials

#### Y5 - Y8, Context for Learning, Workshop Tim Byrne

This workshop focuses on the underlying mathematics of calendars and sundials. Participants are shown how to make a perpetual calendar and a nocturnal or star clock, which is based on the 24-hour rotation of the southern cross constellation. Both calendar and clock are created without algorithms but require an understanding of first principles. The measurement of time theme continues with the construction of a simple equatorial sundial. Participants learn how to modify a sundial to work at any latitude or longitude within a time zone. Some other solar instruments are demonstrated as an interesting way of introducing celestial geometry to middle school students.

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The background features a complex, abstract geometric pattern of blue and white lines. The pattern consists of multiple concentric, slightly offset lines that create a sense of depth and movement, forming a circular frame around the central text. The lines are of varying lengths and orientations, creating a dynamic, almost optical illusion effect.

**SESSION  
DETAILS**  
**FRIDAY**  
**6 DECEMBER 2019**



# SESSION F, Keynote, Friday, 9am-10am

## F01 Big ideas: connecting within and across the mathematics curriculum

**F to 8, Curriculum/Assessment, Lecturer, Keynote**  
**Mike Askew AO, University of Witwatersrand, Johannesburg**

Teaching and learning mathematics is sometimes treated in a bottom-up approach, by selecting and ordering a number of small objectives that, we hope, enable learners to get a sense of the ‘big picture’ over time. Complementary to this is a looking for connections within and across mathematics that can inform teaching and learning over time in ways that helps learners understand mathematics as a coherent network of ideas. Thinking about the Big Ideas in teaching and learning mathematics is central to adopting such a perspective in the mathematics classroom. In this keynote Mike will explore some of the Big Ideas in mathematics and how they can support teaching that not only focuses on reasoning and problem solving, as well as fluency, but develops understanding over time by building on, connecting and refining ideas, rather than continually introducing new ones.

## F02 Challenge and enjoyment: Getting the right balance in primary mathematics classrooms

**F - Y4, Pedagogical Content Knowledge, Lecturer, Keynote**  
**Janette Bobis, University of Sydney**

Coupled with the desire to foster students’ mathematical reasoning, is the need to nurture their enjoyment of learning mathematics from a young age. In this presentation I focus on challenging mathematical tasks for the early years primary classroom and suggest teaching and learning strategies to help teachers maintain and build young students’ enjoyment of mathematics.

## F03 A story of change: Transforming how mathematics is taught

**Y7 - Y12, Networks as Communities of Practice, Lecturer, Keynote**  
**Cassandra Marinopoulos, Berwick College**

Berwick Secondary College has worked over an extended period of time to drive change in how mathematics is taught, and how student learn. This journey has involved supporting teachers to develop their capacity as expert mathematics practitioners. This was achieved through many approaches, but central to success was the development of a culture of collaboration and reflection. Teachers at Berwick are asked to reflect on their practice in the classroom on a regular basis.

Student voice is important in the process, as is peer to peer feedback. Join me to hear about the challenges of leading change, the successes achieved, and gain some insights into creating your own change plan for your school.

## F04 Mathematics teaching, learning, assessment and reporting: Time to join the dots

**F - Y12, Curriculum/Assessment, Lecturer, Keynote**  
**Hilary Hollingsworth, Australian Council for Educational Research (ACER)**

If making connections is seen as crucial to the success of mathematics education in the future, and we aspire as mathematics educators for student engagement and growth mindsets, then how might we remedy the disconnect between recommended approaches to mathematics teaching and learning and existing arrangements for mathematics assessment and reporting? This keynote will explore this question through: highlighting current policy and practice landscapes related to teaching, learning, assessment and reporting; presenting perspectives of key stakeholders related to how reporting might better communicate learning progress; and positing some principles for creating stronger connections between mathematics teaching, learning, assessment and reporting.

## F05 Intuition and Cognitive Conflict: From “Oh-Oh” to “Ah-Ha”

**Y7 - Y12, Pedagogical Content Knowledge, Lecturer, Keynote**  
**Greg Oates, University of Tasmania**

Student’s ability to engage with challenging tasks often requires them to take risks and to build on initial intuitions they may have about the problem. However, students can frequently doubt their intuitions and be afraid to pursue them for fear of being wrong. Following your intuitions down sometimes blind alleys is a natural part of authentic mathematical enquiry. This presentation will demonstrate strategies that encourage students to take risks and not be afraid of being wrong. We will explore tasks that are deliberately designed to go against students’ intuitions or beliefs about mathematics they have previously constructed. With considered approaches we can successfully move students towards ‘Ah-Ha’ moments of positive discovery and growth. Such tasks can be used to help students build conceptual connections across all curriculum levels. This presentation is targeted for Year 7 to senior secondary teachers.



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# SESSION G, Friday, 11am-12pm

## G01 Warm Ups: More Than Just Tuning In

**F - Y6, Pedagogical Content Knowledge, Workshop, Repeat/Commercial**  
**Marissa Cashmore, Macclesfield Primary School**  
**Laura MacLean, Banyan Fields Primary School**

This workshop will be all about choosing authentic rich warm up activities or games and connecting them to fundamental skills and strategies that need to continuously be revisited throughout the year.

We will show participants how to use questioning during warm ups to extend and promote meta-cognition as well as demonstrate some quick formative assessments.

During this workshop we will also establish ways to extend some of these warm up tasks into further investigations. Some references to Maths300 will be used.

## G02 Proficiencies - The 'Action' of Mathematics

**F - Y4, Context for Learning, Workshop**  
**Judy Gregg and Genovieve Grouios, Consultants**

To be a true mathematician one needs to 'engage in' and 'do' mathematics. Building mathematical proficiency involves conceptual understanding and procedural fluency. These concepts are not separate, but rather closely connected to enhance understanding in mathematics. This workshop, aimed at F-4, will investigate fluency, problem solving, reasoning and understanding - the 'verbs' that underpin the learning of the mathematical content - the 'nouns'. We will explore a variety of activities that embed these actions with the content to enable real mathematics to occur.

## G04 Approaches to support planning for student-centred learning in mathematics.

**F - Y6, Curriculum/Assessment, Workshop, Repeat** Aylie Davidson, Deakin University

As teachers of mathematics, it is an expectation that we plan student-centred learning sequences and experiences. This

includes developing 'big-picture' thinking and designing lessons that are challenging, engaging and meet the needs of diverse learners. However, the day-to-day realities of planning for student-centred learning can be difficult and time-consuming. In this workshop, Aylie will share research-based approaches that can support teachers overcome the complexities of student-centred mathematics planning and make high-quality planning decisions to enhance student engagement and learning in mathematics. Aylie will also offer a planning model that can support teams of teachers focus on the key aspects of student-centred mathematics learning. Please bring along sample math unit/lesson plans and/or yearly/term overviews to share.

## G05 A university-school partnership model for strengthening mathematics education

**F - Y6, Networks as Communities of Practice, Lecture**  
**Wendy Goff, Swinburne University of Technology**

The study reported in this presentation is a partnership story between an Australian university and a local primary school. The partnership was embedded in a first-year undergraduate teacher education course and in the junior classes of the primary school. It was explicitly focused on strengthening mathematics education across the two contexts. In this presentation the partnership model will be outlined and the challenges and opportunities of working together to enhance mathematics education across contexts will be highlighted. The strengths of the model will then be discussed in relation to preservice teacher education, teacher and lecturer professional learning, and strengthening mathematics education in primary schools.

## G06 Teaching Fractions Developmentally

**F - Y8, Context for Learning, Lecture**  
**Bruce Williams and Natalie Gugger, St. Michael's Grammar School**

Fractions remain a mystery to most students, while the teaching of fractions is daunting to many too. We want to allow access and success for ALL students in all of mathematics, including the "mystery" of fractions. Your students will absolutely understand fractions in a couple of simple engaging lessons.

Teaching Fractions developmentally involves no GCF's or LCM's, nor are there any "rules" to remember! This approach develops a complete understanding of all four operations with fractions that students enjoy and understand.

"When I try to remember a rule, I forget that rule. When I understand, I can never un-understand".

## G07 VCAA Mathematics Annotated Work Samples

**F - Y10, Curriculum/Assessment, Workshop, Repeat**  
**Crystal Afitu and David Leigh-Lancaster, Victorian Curriculum and Assessment Authority (VCAA)**

The VCAA has developed a set of twelve annotated student work samples during 2019. This session will provide an overview of these resources, and look at how they could be used to support curriculum, pedagogy and assessment in the Victorian Curriculum: Mathematics F - 10. We will also discuss how schools might use a similar approach to develop complementary school-based annotated student work samples. Participants should bring a laptop and have downloaded the VCAA Mathematics work samples.

## G08 Using manipulatives in the High School classroom

**Y7 - Y12, Tools and Technology, Workshop, Repeat**  
**Vicky Kennard, Australian Mathematical Sciences Institute (AMSI)**

Too often the use of manipulatives, or concrete materials, is portrayed as only for those with lower ability and not for high school at all. In many classrooms there are cupboards full of such equipment gathering dust. In this presentation I will be looking at why we should be using these resources and giving a hands-on demonstration on how we can do this effectively.

## G09 Excel enhances the teaching and learning Mathematics

**Y7 - Y12, Tools and Technology, Workshop**  
**Karim Noura, Melbourne Polytechnic**

In this presentation, teachers will share ideas and practical applications of using Excel in the maths classroom for students from Year 7 to Year 12.

Applications will include various activities such as measurement, probability, statistics, algebra and problem solving. Please bring your lap-top or any other device where you are able to use MS-Excel.

## G10 What's New with CX II? Exploring TI-Nspire

**Y9 - Y12, Tools and Technology, Workshop, Commercial**  
**Peter Fox, Texas Instruments**

Did you know the TI-Nspire CX Premium Teacher software incorporates the TI-Navigator software? It is a FREE upgrade from your current Teacher software licence. You can now disable the CAS functionality of your student's TI-Nspire CX II CAS handhelds, have students present to the class and a whole lot more! Come and see what other secrets are hiding in the menus. Recommended: BYO Laptop with the new software. Ti-Nspire CX II handhelds will be provided.

## G11 Connecting Probability

**Y7 - Y10, Pedagogical Content Knowledge, Workshop**  
**Heather Ernst and Anna Morton, Federation University Australia**

Where does the topic of probability fit with the maths curriculum? It is often the topic squeezed into the end of a busy year but it can effectively be connected into many if not all mathematics topics across the secondary year levels.

This workshop will trial games, experiments and learning activities to engage and support the learning of probability throughout the whole year. Through examining and challenging a number of common misconceptions associated with probability, the benefits of integrating probability more broadly will be demonstrated. For example, probability can support the understanding of fractions and fluency with numbers but even more importantly it can assist with problem-solving and the development of reasoning skills.

The workshop is aimed at Year 7-10 teachers as they prepare students for the leap into complex VCE probability, but will also help demonstrate how probability can be incorporated into decision making in daily life.

## G12 Wowed by Widgets – The Directors Cut

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Chris Ireson, Melbourne High School/Texas Instruments T<sup>3</sup> National Instructor and Len Bedier, Melbourne High School**

Come and see what everyone has been talking about! “Wowed by Widgets” was a huge success at the Texas Instruments International Conference in Baltimore this year. TI-Nspire™ CX CAS widgets are easy to create and can be a powerful teaching and learning tool. Teachers can use widgets to help demonstrate mathematical concepts and principles. Students can use them to efficiently explore what-if type scenarios and pre-prepare their own for assessment tasks. In this workshop, a series of tried-and-tested widgets will be provided to participants. There will be a discussion about widget construction and content, and participants will build and save their own widgets. No prior widget experience assumed.

It would be an advantage to bring your laptop to the session with the TI-Nspire™ CX CAS Teacher Version 4.5 Software or TI-Nspire™ CX CAS Premium Teacher Version 5.0 Software installed, otherwise bring your TI-Nspire™ CX or CX II CAS Calculator. *Note: The Casio ClassPad is not suitable for the session.*



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

## G13 Recipe to develop VCE Mathematics SAC 101

**Y11 - Y12, Curriculum/Assessment, Workshop, Repeat Echo Gu and Trevor Smith, Lauriston Girls' School**

Developing a School-assessed Coursework that meets the requirements of VCAA assessment guideline could be challenging for teachers new to the subjects. This session aims to help shorten your preparation time when writing a SAC. We will highlight the key focus of outcomes specified in the Study Design, particularly the Unit 3 Application Task for Mathematical Methods and Specialist Mathematics. Upon the close examination of VCAA SAC audit report, a list of 'Dos' and 'Don'ts' will be suggested. In addition, a snapshot of publicly available resources will be discussed. You will gain a better insight into the VCAA audit requirements, and leave with more ideas that can be used as your SAC context in the future.

## G14 Moving Maths Intervention into the Whole Class Setting

**F - Y6, Pedagogical Content Knowledge, Workshop, Repeat John Hein, Rebecca Forder and Rebecca Kerr, St James the Apostle PS**

If you are thinking mathematics intervention is great... but how do you apply the strategies into the classroom? Then we are able to help!

Our presentation will take you through our change journey from having no mathematics intervention to the successful implementation of Learning Framework in Number and Box of Facts in the primary years.

The main focus of the presentation will be to demonstrate how easy it can be to target the needs of all children in your learning community.

All participants will engage with materials, gain a deeper understanding of how to assess, collect data and teach the intervention strategies in a whole class setting.

## G15 The Questioning Classroom

**Y5 - Y10, Context for Learning, Lecture, Repeat Mike Clapper, Australian Mathematics Trust**

Can we generalise...? What if...? What's the connection...? Could we...? These are the sorts of questions we would like our students to be asking. How can we promote a culture within our classroom which allows and promotes open-ended questioning and an exploratory spirit – and still get through the curriculum!

## G16 Curriculum that can connect every student

**Y5 - Y12, Curriculum/Assessment, Lecture, Repeat Steven Goldberg and Madeleine Graham, Prahran High School**

The opportunity to start something new is exciting and limitless. It gave us the freedom to connect the dots of a range of theories, techniques and technology. Here's what we've tried to achieve in our first year at Prahran High School:

- A system of learning that allows every student to progress at their own pace and take ownership of this process.
- An integration of technological solutions that maintains student-teacher interactions as the focal point of learning.
- A goal-setting and reflection mechanism that inclusively tracks growth.
- An explicit skill-building focus on problem-solving and core arithmetic..
- Assessment that is constant and transparent and reporting that authentically reflects student achievement.

## G17 Constructing a Further Mathematics Application SAC

**Y11 -Y12, Curriculum/Assessment, Lecture Robyn Crockett, Camberwell Grammar School**

This presentation will demonstrate the entire process of constructing a Further Mathematics Application SAC. Areas covered will include selection of statistics, construction of open ended questions (as mandated by VCAA study design) and establishing of an effective ratio of calculations, graphing and written interpretation. The presentation will also cover the process followed by staff prior to students completing the SAC. The presenter will provide a helpful analysis of student performance in areas such as use of calculator, graphing and how the task revealed student understanding of the maths. Participants will take home a copy of this original SAC with solutions for use with their own students.

## G18 Problem Solving and PLT's

**F - Y6, Pedagogical Content Knowledge, Workshop, Sara McKee and Melissa Lake, Wedge Park Primary School**

This session will focus on how Professional Learning Teams can work collaboratively to build teacher capacity, through the implementation of problem solving tasks. It will identify



strategies which school leaders and teachers can implement in their PLT's and as part of their whole school curriculum plan. This session will also demonstrate how a problem solving lesson is run, and how student learning and strategies from a lesson can then be used in a Professional Learning Team to identify student understandings and misconceptions, and how this can then inform future planning and teaching.

### **G19 Helping Students Know How to be a Mathematician**

**F - Y6, Pedagogical Content Knowledge, Workshop, Repeat**  
**Sue Gardiner, Merbein P-10 College**

This session will focus on developing a culture within your classroom that encourages students to become curious about their Mathematics, willing to explore, and enthusiastic to challenge themselves. It will focus on how to place importance on Numeracy in the classroom environment and establishing learning expectations through the use of "The Growth Mindset" and "The Learning Pit". It will highlight a method of helping student to break down the steps/ways they can problem solve to be efficient, and the essential elements of reflection and student goal setting.

### **G20 Team Teaching & Student Advocacy**

**Y7 - Y10, Context for Learning, Workshop, Repeat**  
**Simon Pitaro and Natalie Raspudic, St Bernards College**

Learn how mathematics at SBC changed from a teacher centered text book driven one size fits all experience to a personalized student-centered rich learning environment. By using team teaching, flexible classroom spaces and expertise from the academic world, St Bernard's College has transformed learning. In this session you will learn about the general lesson structure and what rich tasks look like and how you can create your own.

### **G21 Adusu Algebra: Concrete Materials assisting understanding**

**Y7 - Y10, Tools and Technology, Workshop, Repeat/Commercial**  
**Ruth Adusu, Adusu Algebra**

Adusu Algebra is a concrete materials kit developed by full-time Mathematics teacher Ruth Adusu who has over 30 years' experience in the classroom. It allows students to physically build and manipulate expressions, equations and inequalities. By bringing algebra "out of the abstract and into the concrete" it avoids or eliminates common misunderstandings, provides immediate feedback, supports

correct mathematical working, simplifies algebraic processes, allows students to explore questions, and improves recall. Differentiation is also facilitated by the use of Adusu Algebra.

Participants will use a student kit to complete a variety of questions to experience for themselves the value of having a hands on tool for algebra. We will discuss common misunderstandings and how language and notation can mislead or confuse students.

Even if participants do not purchase this product, attending this session will give teachers fresh insight and provide strategies to better equip their students to approach algebra with confidence.

### **G22 Shaping' Our Geometry Curriculum**

**F - Y6, Curriculum/Assessment, Workshop**  
**Mark Gleeson, Lumen Christi Catholic Primary School**

Geometry is often seen in Primary School as learning about shapes. It's so much more. This presentation workshop will explore a sequential development of key geometry (and measurement) ideas and how they link to, and support the understanding of, other areas of the curriculum. It will involve exploring lesson ideas, learning progressions, key ideas, and misconceptions/missing conceptions. Bring Laptop to access presentation.

### **G23 How to teach Secondary Mathematics**

**Y5 - Y12, Curriculum/Assessment, Lecture, Repeat**  
**Peter Collins, Dandenong High School**

You have just got a job teaching maths – what do you do now? Things I know and use now, that I wish I knew 29 years ago.

In this session, the presenter will outline a number of strategies and philosophies, that he has found since finishing university, that he uses while planning and teaching class. He uses them because they work. They are from a wide variety of sources, and have all been effectively trialled. They are not just based on avoiding pitfalls, they are based on maximising learning success and creating the environment in which this can happen. The format will be a lecture, but with an emphasis on being interactive with a lot of attendee input. This session is aimed at beginning maths teachers – both inexperienced teachers and teachers who are teaching outside their area of training. It is delivered by a very experienced teacher and presenter.

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

## G24 Desmos Classroom Activities for Formative Assessment

**Y7 - Y10, Tools and Technology, Lecture**  
**Bryn Humberstone, Brighton Grammar School**

Desmos is well known for its excellent graphing calculator, but many teachers do not know about its potential to be used to probe students' thinking through quizzing activities in the Mathematics classroom.

In this talk I will show some of the ways in which Desmos activities can be used in Year 7-10 classes to diagnose misconceptions and help clarify next steps in student learning. I will discuss how to run an activity and how to interpret student responses quickly to inform the next phase of teaching.

I will also demonstrate how easy it is to get started with writing a simple Desmos activity that can be used in any classroom where students have internet-enabled devices. Finally, I will give some suggestions on what makes an effective or ineffective activity in order to engage a whole class in their learning. No prior experience with Desmos is required.

## G25 How can engagement with online communities support my maths teaching?

**F - Y12, Networks as Communities of Practice, Workshop**  
**Michaela Epstein, MAV and RMIT University**  
**Oliver Lovell, Sunshine College**  
**Amie Albrecht, University of South Australia**

The online community of mathematics educators is a vibrant world of ideas, rich discussion and warm support. From enthusiastic new teachers to the extraordinarily experienced, the individuals within it hail from all over the globe and meet via blogs, twitter and other forums. However, it can often be hard to know which communities to engage in, how to use the technology (e.g. Twitter), and where to start!

This session will include a focus on:

- Several educators sharing how participating in online communities has positively influenced their maths teaching.
- Who you can connect with.
- The sorts of ideas and resources you can expect to come across, and where to find them.

The session will also include an activity simulating an online social network with space provided for attendees to share and learn from each other.

## G26 Concept Cartoons - The Best Idea You've Never Heard Of

**F - Y10, Curriculum/Assessment, Workshop, Repeat**  
**Michael Minas, Love Maths**  
**Jess Greenbaum, Moonee Ponds West Primary School**

Were you hoping to leave the 2019 MAV conference with at least one innovative idea that both excites you as teacher and will engage your students? If the answer is "yes", then this is the workshop for you. Concept cartoons are a powerful thinking tool that encourage mathematical debates amongst students, while providing teachers with valuable assessment information. By targeting common misconceptions, they help students to develop deep understandings about a wide range of mathematical concepts. Best of all, concept cartoons are easy to plan and implement. Participants will be given guidance during the session on how to plan concept cartoons of their own, so everyone will walk out of the session with a resource designed specifically for your year level and the area of maths you are currently focussing on.

## G27 Whole School Curriculum Design Around the Big Ideas

**F - Y6, Curriculum/Assessment, Lecture**  
**Jen Briggs and Jade Seddon, Derrimut Primary School**

Schools require a scope and sequence to guarantee a viable mathematics curriculum. However, this often results in isolated chunking of the concepts and once a year teaching of the big ideas.

Derrimut Primary School is working in partnership with a MAV educational consultant to develop a scope and sequence that allows for multiple exposures to the big ideas through interconnected units of work.

This session will explore the process we have taken to develop this work, the next steps and samples of the Guaranteed and Viable Curriculum, Scope and Sequence and supporting Developmental Continuums.

## G28 Mathematical Language... Please Explain!

**F - Y4, Networks as Communities of Practice, Workshop**  
**Belinda Atkin, Penelope Townley and David Sukh, Clayton North PS**

Our presentation will focus on the journey of our MAV project "Mathematical Language" and why we have identified this as the most important area to focus on for our school. This presentation will include how we have changed our Mathematics lessons to strengthen students' development within the proficiency strands. We will incorporate research and professional support we have had, along with stages of implementing a whole school approach in Mathematics.

## G29 Using Data To Inform Your Teaching

**Y7 - Y10, Curriculum/Assessment , Lecture, Repeat, Commercial**  
**Andrew Spitty, Essential Assessment**

In this hands-on session, participants will use a number of different data sets to explore how to read, interpret and then plan to inform a mathematics teaching scenario. The data sets will be presented in a number of different formats; including spreadsheets. The interpretation will include linking to the mathematics curriculum. Participants will work in groups to discuss and consider how to plan with the data to inform, and drive teaching.

## G30 Scaffolding Mathematical Reasoning for Junior Secondary

**Y7 - Y8, Pedagogical Content Knowledge, Lecture, Repeat/Commercial**  
**Carolyn Smales and Joel Townsend, Firefly Education**

Discover a simple and logical method for teaching students how to approach mathematical reasoning. Too often, students transition from primary to secondary school without having been taught how to reason mathematically. When asked to complete problems or inquiries that require them to apply reasoning skills, such as “proving”, “explaining”, “generalising”, or “justifying”, they don’t know what to do. In this presentation, you will learn how to scaffold a meta-cognitive approach to reasoning, that will not only help students to unpack and solve complex reasoning questions, but also communicate their answers appropriately - an essential skill for life beyond the classroom.

## G31 Algebra for All even 6 year olds

**F - Y2, Pedagogical Content Knowledge, Workshop, Repeat**  
**Courtney Chalmers and Sarah Finnegan, Christ the Priest Primary School**

WOW! Young children engaging in generalising and making connections with other mathematical concepts. If you doubt that this is possible then this presentation is for you!

This session will showcase the Pattern and Structure Mathematical Awareness Program (PASMAL) for children in the first 3 years of formal schooling (F-2). The Program is based on research evidence undertaken by Joanne Mulligan and Michael Mitchelmore. It is organised as a series of learning sequences each of which consists of a number of learning experiences focused on one or more early mathematical structures. These learning sequences are grouped into multiple learning pathways showing that visualising and developing mental pictures provides the

foundation for deeper learning and understanding of related and interrelated mathematical concepts.

Practical examples of the following pedagogical practices: Modelling, Representing, Visualising, Generalising and Sustaining will show how to engage young children in generalising.

## G32 Algebra Through Geometry

**Y5 - Y8, Context for Learning, Workshop**  
**Douglas Williams, Mathematics Centre**

A square is  $X$ . A quadrant 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 mathematicians question: “Can I check this another way?”. You will be using materials based on the work of Geoff Giles and, with a partner, 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.

## G33 Worthwhile CAS calculator use in this year’s Mathematical Methods Exam 2

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Kevin McMenamain, Mentone Grammar**

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

## G34 Sparking interest and engagement in the secondary classroom

**Y7 - Y10, Context for Learning, Lecture, Repeat/ Commercial**  
**Vanessa Rule-Paddle and Tim Carruthers, Pearson**

This session explores ideas for chapter starter activities and lesson learning activities that are designed to engage middle years’ learners. Chapter starters which are intriguing, inspire students to ask questions, are visually stimulating

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

and are linked to the real world have the potential to create meaning around why we study maths. Similarly, learning activities that are contextualised and help to develop conceptual understanding are a great way to maintain student engagement. While this session is focused on years 7-10 mathematics, the pedagogy explored is applicable to other year levels

## G35 Bringing VCE Maths to Life with TI-Nspire

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Stephen Crouch, Frankston High School - VCE Campus**

This session will explore how the TI-Nspire (software and/or handheld) can be used to create dynamic representations/interactivities which give tough concepts in VCE Maths a new life beyond the static images drawn on the whiteboard. Learn how to create content that will Make Connections and mesmerise your students (and colleagues)!

Topics that will be covered include:

- Unit Circle interactivities (including graphs of sin, cos tan)
- Dynamic representations of the derivative (including first principles)
- Optimisation and Calculus
- Visualising Volumes of Revolution

Whilst the presentation will focus on using the Student or Teacher versions of the TI-Nspire platform, it is possible to use the CX CAS handheld for this purpose, though the software is much more efficient to use."

Please bring a charged laptop with the TI-Nspire CX CAS software (Student or Teacher version) installed. This software can be downloaded from the URL <https://education.ti.com/en-au/software/search> (in the TI-Nspire CX CAS section). Alternatively, a TI-Nspire CX CAS handheld can be used.

## G36 Investigating Complex Numbers Using Series

**Y11 - Y12, Pedagogical Content Knowledge, Workshop, Repeat**  
**Ray Williams and Katie Bye, St Marks Anglican Community School**

We know that geometric series can be summed to infinity if the magnitude of the ratio is less than 1.

This activity looks at the behaviour of complex numbers under multiplication and explores the behaviour of summing the series for the three cases where the magnitude of the complex number =1, <1, or >1

## G37 Wolfram Language coding introduction, challenging tasks, formative assessment

**Y5 - Y12, Tools and Technology, Workshop, Repeat**  
**Ian Willson**

The Wolfram Language and Mathematica software can contribute enormously to the development of both mathematical competence and coding skills. This can occur at the intersection of challenging Mathematical tasks, coding, exploration, discovery, collaboration and formative assessment. This workshop will reference all of these elements as they inform and underpin a set of introductory Wolfram Language activities designed to teach basic coding syntax using Graphics primitives, directives and options for design and creation. Participants will engage in a series of classroom-type learning activities with hand-out tasks. Suitable for all levels, both secondary and primary, it's an introduction to a mighty powerful coding language.

## G38 Rover Will Find the Solution

**Y7 - Y12, Tools and Technology, Workshop**  
**Rodney Anderson, Moreton Bay College and Jim Lowe, Queensland University of Technology**

This session will engage participants in moving around the Cartesian plane and solving systems of equations using multiple strategies. These strategies will include solving graphically and with coding. A TI-Innovator Rover will be used to verify the results of the coding.

## G39 Maths lessons: off to a cracking start!

**F - Y8, Pedagogical Content Knowledge, Workshop**  
**Rob Vingerhoets, Rob Vingerhoets Education Consultancy**

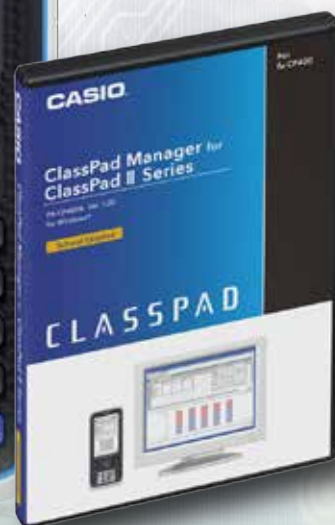
If you can win your kids over with a really enjoyable and engaging warm-up activity, essentially you're on your way to a successful session. Explore a range of Foundation to Year 8, minimum preparation, mathematically-rich, high-engagement activities for all content areas. Rob will discuss the fundamental elements of an engaging lesson, focusing on the crucial importance of the warm-up. Rob has extensive experience in teaching children and sharing his knowledge with teachers as a consultant. He is a truly gifted mathematics educator and you will leave this session challenged, inspired with a smile on your face and most likely smiling! Rob reminds us all how much fun maths is!



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

## G-H01 Developing early maths concepts through play

F - Y2, Pedagogical Content Knowledge, Workshop, Repeat Leah O'Neill, Kennedy Press

Young students are active participants in their learning, particularly when engaged in play contexts but how do we best use play to teach mathematical concepts and ensure deep understanding?

Participants in this workshop will explore the characteristics of good maths learning for young students and develop a short unit of work for use in their own classroom. This will be based on a simple planning structure that follows a sequence of lessons that includes:

- Child initiated spontaneous play
- Teacher initiated discussion of the mathematical focus
- Challenging problems
- Student developed strategies, sharing and practice
- Questions and activities that require students to transfer and adapt what they have learnt.

Ideas for implementation and for recording student progress will also be presented and discussed.

## G-H02 Taking conceptual understanding to the next level in Mathematical Methods

Y11 - 12, Tools and Technology, Workshop  
Sanjeev Meston, Flinders Christian Community College

This session will focus on using the CAS and other forms of Technology (mainly TInspire CX and CX-II) to improve student learning outcomes and conceptual understanding in the mathematical Methods course. This session will also provide techniques for teachers to use CAS technology as a very powerful teaching tool. A part of the session will be dedicated to using the CAS output files as a compatible file for Learning Management systems like Moodle etc.

## G-H03 Constructing statistical application tasks in Further Mathematics

Y11 - Y12, Curriculum/Assessment, Lecture, Repeat Peter Jones

As part of their school-based assessment, Further Mathematics students are required to complete a statistical Application Task. This session aims to guide participants through the process of taking a data set and using it to develop the sort of questions suitable for use when constructing a statistical analysis task. Topics covered will include, finding suitable real-world data sets and the many pitfalls, primary versus secondary data, sampling, formulating appropriate statistical questions that cover an appropriate range of levels of difficulty and why it is hard to find a single real-world context that will cover the full breadth of the curriculum. Web references to some data sets that might be used suitable for constructing future tasks will be provided.

## G-H04 Masterclass: Thrive and survive: The first five years of primary school teaching!

F - Y6, Networks as Communities of Practice, Workshop  
Jennifer Bowden, The Mathematical Association of Victoria and Ellen Rennie, Consultant

It is quite well sensationalised that 40 – 50% of graduate teachers are leaving the profession before they have reached the milestone of five years of teaching. In this two hour masterclass we will make the connection between the different elements of teaching ensure teachers continue to thrive as they develop their careers. With the balance of classroom management and establishing relationships with parents, managing workload and ensuring your curriculum planning is grounded on evidence based assessment data, there is no doubt graduate teachers can feel overwhelmed. In this workshop we will share and unpack engaging warm ups and games, a bank of accessible resources, efficient assessment and data collection, handy hints for managing students and mindfulness for you! This special masterclass will assist graduate teachers to navigate their first five years in the classroom with resources, tips and hints to ensure they are waving, not drowning!

## **G-H05 Formative Assessment with Mobile Devices in Mathematics Classroom**

**Y7 - Y12, Tools and Technology, Workshop, Repeat**  
**Irina Lyublinskaya, Teachers College, Columbia University**

In this interactive session you will learn about various ways mobile technology can be used to support students' mathematics learning through free APPs and internet-based tools for mobile devices. Bring your own mobile device.

## **G-H06 Learning mathematics through a spirit of inquiry**

**F - Y6, Pedagogical Content Knowledge, Workshop**  
**Lee-Anne Pyke, Consultant and Ellen Corovic, The Mathematical Association of Victoria**

Teachers often declare that the most important part of their job is to encourage their students to be mathematically curious. In this session inquiry practice will be examined through the lens of challenging maths tasks that foster curiosity, engagement and understanding. Students need time to use their knowledge and skills by thinking critically, applying knowledge to new situations, analysing information, comprehending new ideas, communicating, collaborating, solving problems, and making decisions. Using challenging tasks, students are encouraged to solve contextualised mathematical problems using their strategies, skills and understandings in collaboration with their peers. In summarising their responses and identifying the mathematical concepts, students' understanding is developed and deepened.

# SESSION H, Friday, 12.10pm-1.10pm

## H01 Bringing Maths Learning to Life

**Y3 - Y8, Curriculum/Assessment, Workshop, Repeat/Commercial**

**Dan Steele and Dianne Liddell, Engage Empower Educate, Upgrade Think Learn**

This presentation is focused on helping teachers develop rich learning units that engage students, provide real-world experiences of maths and deepen students' understandings of mathematical concepts, strategies and skills.

Through this workshop, participants will be provided with resources and materials to support them in developing engaging mathematical units and learning experiences from Year 5 to Year 8.

Key learnings from the last ten years, including what not to do and key considerations when implementing these units of learning, will also be shared with all participants to assist them in planning and developing future units.

During the workshop, participants will be provided with the opportunity to collaborate with others to develop potential learning units, identifying ideas, skills and learning/teaching considerations for maths learning units. Participants will receive access to all examples developed within the workshop.

Having access to a laptop/device to access Victorian Curriculum will be helpful. A phone/device with a camera is also recommended to be brought along. Textas and paper will be provided to assist the collaborative creating time during the session.

## H02 Nailing the 2018 Methods Exam 2 with a ClassPad

**Y11 - Y12, Tools and Technology, Workshop, Repeat Alastair Lupton, Le Fevre High School**

The mathematics study design 2016 - 2020 requires an open and explorative approach to developing SAC material that ensures the tasks are application, modelling or problem-solving in nature and not just an extended collection of Examination 2 questions. This session gives you the opportunity to explore starting points and create the skeletal detail for the tasks you would use in 2020. We will look at

a selection of application and modelling/problem solving starting points that will act as stimulus material to initiate discussion and then provide the focus of the investigations.

## H03 Making Maths Engaging for Students AND Teachers!

**F - Y6, Context for Learning, Workshop, Repeat Bernard Kerrins, Bendigo Secondary Network Schools - Weeroona College, Bendigo South East College, Crusoe College**

Students often say that what we are teaching them has little relevance or purpose. Much of what is taught has no context or immediate use, leading to boredom with maths.

They are becoming knowledgeable, but not knowledge-able.

Even when we ask them to do relatively somewhat engaging activities, it becomes dress rehearsal learning as there is no real purpose to it.

This workshop will focus on 3 aspects:

- Using rich contexts for learning where students can connect their learning to real life experiences.
- How teachers can become more invigorated and excited about their lessons, and passing this enthusiasm on to their students.
- Project Based Learning, completing projects that leave a legacy for others and creating hooks to engage our students.

This workshop will have you and your students wanting to rush into your maths lessons as they will now have a real purpose for learning.

## H04 Further Maths Exams: using the CAS calculator efficiently and effectively

**Y9 - Y12, Tools and Technology, Workshop Kevin McMenamin, Mentone Grammar**

This session will look at questions from this year's Further Maths papers and discuss how useful the CAS calculator was in determining their answers. This would be particularly useful to teachers who are new to the subject and teaching for the first time. The session offers a hands-on experience that will give you the opportunity to use the calculator just

like the students on all the questions where it would be most beneficial. The session is open to Ti-Nspire and ClassPad users and the featured calculator will be the Casio ClassPad.

## H05 Using Education Perfect to make connections in Maths

**Y7 - Y10, Curriculum/Assessment , Workshop, Repeat/Commercial**  
**Jess Mikecz, Education Perfect**

Education Perfect is an online learning and assessment platform that contains a wide range of resources which have been aligned to the Australian Curriculum. Teachers are able to easily create online assessments that can assess individual students or their class as a whole. These assessments can be used for pre-testing, formative assessment, revision tests and summative assessment. They are automatically marked for you and provide a snapshot of each student's level of ability at that point in time. From the detailed analysis that the system provides, teachers can make connections between student achievements and strategies to help improve areas of weakness or extend students further. This session will provide teachers with the skills to be able to create and administer effective assessments through the Education Perfect platform as well as dissect the detailed analysis provided to effectively differentiate their Maths classrooms. Welcome to bring own device (laptop, tablet, etc) and be logged on to EP during the session, but not essential.

## H06 Making connections through games in VCE Maths

**Y11 - Y12, Pedagogical Content Knowledge, Workshop, Repeat**  
**Rosalind Willsher and Emily DiBella, St Augustine's College**

Many of our most creative ideas and "Aha" moments occur when we are relaxing or having fun, rather than intensely focussed on our learning. In maths, we can allow our brain the opportunity to wander and make connections between ideas by playing games. In this session we will share (and play) games that will support learning in VCE maths. This includes games to tune in at the start of a lesson, revise previous content, break up long double periods in a constructive way and to support hands-on and active learners. The content will be based on VCE maths, but many of the ideas could be adapted for lower year levels.

## H07 Interesting Physics Applications for Methods & Specialist SACs

**Y11 - Y12, Context for Learning, Lecture, Repeat**  
**Wayne Semmens, Al Siraat College**

CAS calculators provide accessibility to physics applications for use in VCE Methods & Specialist SACs.

This session will review a Year 12 Methods Application Task which involves modelling solutions of the Damped Harmonic Oscillator to minimise the impact of Earthquakes on buildings. This session will use products of exponential and trigonometric functions, tangent lines, average rate of change and average value to investigate parameters which minimise the impact of Earthquakes on buildings. No physics knowledge will be required.

CAS calculator or software required.

## H08 Kicking goals with Year 9 Data & AFL Fantasy

**Y7 - Y10, Context for Learning, Lecture, Repeat**  
**Anthea Wood and Lachlan Short, Mansfield Secondary College**

For the last 4 years at Mansfield Secondary College, we have been teaching data to our Year 9 classes through the free and fantastic AFL Fantasy. Students each manage a team, make decisions on trades using statistics and compare teams by applying mathematical conditions. The data they work with is relevant to them, has a context and also generates a lot of discussion and fun! Initially created to increase school engagement, we will talk through the advantages and highs of the program, how to set it up, some of the issues you might face and we will give you the self-directed workbook that we have developed.

## H09 Helping Students Know How to be a Mathematician

**F - Y6, Pedagogical Content Knowledge, Workshop, Repeat**  
**Sue Gardiner, Merbein P-10 College**

This session will focus on developing a culture within your classroom that encourages students to become curious about their Mathematics, willing to explore, and enthusiastic to challenge themselves. It will focus on how to place importance on Numeracy in the classroom environment and establishing learning expectations through the use of "The Growth Mindset" and "The Learning Pit". It will highlight a method of helping student to break down the steps/ways they can problem solve to be efficient, and the essential elements of reflection and student goal setting.

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

## H10 Using Computers in a Maths Classroom with Year 11/12+ Students

**Y11 - Y12, Tools and Technology, Lecture, Repeat/Commercial**  
**Robert Rook, Mathplot**

This session will run through using technology in the classroom for Years 11/12+.

Among the topics covered are graphing, calculus, consumer maths, complex numbers, distributions, functions, parametric and polar graphs, regression, statistics (junior & senior), modelling data, trigonometry, probability and vectors to name a few.

Generation of various 2D and 3D equations including above topics plus 3D planes, surfaces, tori, knots, solids of revolution.

Use of the senior worksheet generator (Year 12), topic revision/test program, homework book generator will be explained. Questions are randomly generated giving an infinite number of questions with not only answers but full solutions available for questions.

Questions can be attempted at the computer and at home and results saved for progress to be observed. Questions can be emailed to teachers.

All attendees will receive a free registered copy of the latest software to take home and load on their home computers. Download from [www.mathplotplus.com](http://www.mathplotplus.com)

## H11 Concept Cartoons - The Best Idea You've Never Heard Of

**F - Y10, Curriculum/Assessment, Workshop, Repeat**  
**Michael Minas, Love Maths and Jess Greenbaum, Moonee Ponds West Primary School**

Were you hoping to leave the 2019 MAV conference with at least one innovative idea that both excites you as teacher and will engage your students? If the answer is "yes", then this is the workshop for you. Concept cartoons are a powerful thinking tool that encourage mathematical debates amongst students, while providing teachers with valuable assessment information. By targeting common misconceptions, they help students to develop deep understandings about a wide range of mathematical concepts. Best of all, concept cartoons are easy to plan and implement. Participants will be

given guidance during the session on how to plan concept cartoons of their own, so everyone will walk out of the session with a resource designed specifically for your year level and the area of maths you are currently focussing on.

## H12 Making Music with Maths

**Y5 - Y12, Tools and Technology, Workshop**  
**John Bament, O'Loughlin College**

Did you know that ancient Greeks, in particular the Pythagoreans, are known as the first to investigate musical scales in terms of simple ratios? In this session, participants will use proportional reasoning to write code that will create the sound of music on the TI-Innovator™ Hub! Applying the principles of musical scales discovered by the Pythagoreans, participants will encode musical notes – including rhythm – by representing each note with its sound frequency and duration in time. LEGO® Blocks will be demonstrated as a manipulative to help analyse the rhythm of a song snippet. Learn how to harmonize music and mathematics in your classroom!

## H13 Mathematics Learning Difficulties

**F - Y8, Pedagogical Content Knowledge, Workshop, Repeat**  
**Nathalie Parry, Speld Vic**

This workshop will provide participants with an understanding of the characteristics of mathematics learning difficulties including dyscalculia. Dyscalculia is an innate difficulty in learning or comprehending mathematics. Students with Dyscalculia have trouble understanding numbers, learning how to manipulate numbers, learning mathematical facts, and a number of other related difficulties. The DFES (2001) defines dyscalculia as 'a condition that affects the ability to acquire arithmetical skills. Dyscalculic learners may have difficulty understanding simple number concepts, lack an intuitive grasp of numbers, and have problems learning number facts and procedures. Even if they produce a correct answer or use a correct method, they may do so mechanically and without confidence.' Workshop participants will review a range of practical strategies that will support these children in their mathematics and numeracy development, both in and out of the classroom.

## H14 Number Talks in the Primary Classroom

**Y3 - Y6, Context for Learning, Workshop, Repeat**  
**Renee Patel and Lauren Lamont, Mitcham Primary School**

Number Talks are an engaging way to give all students an opportunity to share, and build, on their strategies to mentally



problem solve. This exposes students of all levels to the opportunity of learning from collaborative conversation. A Number Talk is a five to fifteen minute classroom conversation around purposefully crafted computation problems that are solved mentally to build number sense and mathematical reasoning. Number sense is something that cannot be taught, however, it is through exposing students to activities like Number Talks, that this vital key to their learning can develop.

In this session you will see what a Number Talk looks like and learn how to run one. You will walk away with resources you can use in your school instantly, as well as skills to create your own!

### **H15 From Print to Digital: What can a free maths textbook offer?**

**Y5 - Y12, Tools and Technology, Lecture, Commercial Craig Blake, Mathspace**

Are you planning to transition to digital resources? Mathspace has partnered with Westpac to make their online digital textbook, Mathspace Essentials, free for all Australian schools.

This is a comprehensive online resource which is mapped to the VIC curriculum for Year 3 to 12. With thousands of topics and video lessons, as well as step-by-step support on practice questions, students can learn through interactivity for free.

This session is for anyone interested in learning how to use this free resource in the classroom. Craig will take you through some great examples of content, including topics and investigations for offline classroom activities.

Participants need no prior experience with Mathspace.

### **H16 Inquiry-Driven Maths Planning: Using themes to link curriculum**

**F - Y6, Curriculum/Assessment, Workshop Tim Teague and Stan Grazotis, Bell Park North Primary School**

This workshop will assist teachers with planning and interconnecting Maths curriculum, driven by Inquiry and STEM themes.

The session will support teachers to:

- Clearly connect Maths with STEM and Inquiry themes and topics with all areas of the curriculum, using a hands-on, student driven and project based approach.

- Use STEM technology to best complement student learning in Maths and increase student engagement.
- Use Maths and technology to foster creative thinking and problem solving across all areas.
- Teach 'through' a task, not 'to' a task, providing the opportunity to integrate Maths and STEM themes throughout all lessons.

Given that Maths curriculum is never isolated, this workshop will give teachers the opportunity to see the interconnection of the curriculum when using themes, allowing for a collaborative and inclusive approach to planning.

### **H17 Finding gaps in student learning! Are you struggling to engage middle school students in the maths classroom?**

**Y7 - Y12, Curriculum/Assessment, Lecture, Repeat Adam Kruger, Wesley College**

Students learn best when they are motivated to learn by seeing the value and importance of the information presented. This presentation will exhibit an effective way to analyse student results along with how to engage students in the classroom.

Throughout the session I will demonstrate how I motivate students to learning, create an interactive atmosphere to allow for student voice, build connections through directed assessments, provide opportunities to apply knowledge to real world situations, challenge and engage students through effective feedback strategies.

I will demonstrate how I effectively analyse student results using a data tool to identify key areas of concern/weakness.

By the end of the session, each attendee will walk away with engaging activities, strategies that they can use immediately in their classroom. Bring your laptop.

### **H18 From sharing to ratios: It's all about proportions.**

**Y5 - Y10, Pedagogical Content Knowledge, Workshop, Repeat Helen Booth and Leanne McMahon, Australian Mathematical Sciences Institute (AMSI)**

Understanding ratios and proportion and being able to reason proportionally are required skills in many STEM areas, yet proportional reasoning is consistently highlighted as an area of difficulty for many students. Identified as one of the Big Ideas in Number (Siemon, Bleckly & Neal (2012)) and as one of the best indicators of student understanding of rational

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

numbers (Lamon, (2012), developing proportional reasoning is important. How can we make the concepts involved in proportional reasoning more accessible to students? How do we incorporate practical, concrete models that move students through additive to abstract multiplicative thinking? This workshop will explore a variety of Pedagogical Content Knowledge that support the development of proportional reasoning, using hands-on and representational models to develop more efficient abstract strategies.

## H19 Edrolo for Mathematics: Data, Differentiation and Exam Preparation

**Y11 - Y12, Tools and Technology, Workshop, Repeat/Commercial**  
**Liam Ferris and Mark Drummond, Edrolo**

Want to learn more about how to get the most out of Edrolo with your VCE Mathematics classes? Join us for this professional development workshop where we'll show you how to effectively use Edrolo for formative assessment and exam preparation. The workshop will include a deep-dive into using our scaffolded exam-style questions, student self-marking and accessing insightful data to guide teaching & learning in your classroom. You will also have the chance to collaborate with teachers from different schools to discuss approaches for integrating Edrolo into your Mathematics curriculum.

This session is best suited to teachers with an existing Edrolo subscription, however if you are curious to find out more about Edrolo please feel free to come along and see what we're up to.

## H20 Algebra Tiles - A Lesson in the Unknown

**F - Y10, Pedagogical Content Knowledge, Workshop, Repeat**  
**Nadia Abdelal and Anna Bock, Australian Mathematical Sciences Institute (AMSI)**

Algebraic thinking in students is a crucial part of a mathematical journey that starts in the early years. In this workshop, we will use the Algebra Tiles manipulative tools to look at how we can develop these skills by supporting student understanding in the areas of number, multiplicative thinking and patterns and algebra. We will also look at how you can create algebra tiles for your classrooms to help your students develop a conceptual understanding of algebraic thinking and the concepts of algebra.

## H21 Using a deeper understanding of angle to overcome confusion with protractors: a MATHOMAT workshop.

**Y5 - Y8, Tools and Technology, Workshop, Commercial**  
**John Lawton, Objective Learning Materials**

Student's understanding of angle is made difficult by the absence of a single definition of it as a target quantity. This workshop focuses on how students develop a concept of this important, but often poorly understood, measurement quantity. We explore the several different concepts of angle that need to be understood in middle school. Our workshop shows how students can learn to unify these concepts into a single, visually based, understanding of angle through drawing activities using the Mathomat template and its associated student book. The aim of these activities is to overcome the problem, identified in major research studies, that the structure and purpose of protractors as a tool are opaque to many students; leading to greater skill and confidence with the use of protractors as a tool. This workshop uses the new Mathomat v2 geometry template and student book.

## H22 Keeping it real - Data, data and more data Y5 - Y10, STEM, Workshop, Repeat/Commercial

**John Widmer, Mag-Net Online STEM Educators**  
**Juan Ospina León, Teach for Australia**

Society is changing with automation, technology and vast amounts of data being created at an incredible pace. Many jobs are changing or being created requiring STEM skills. The "TE" elements of this acronym are often misunderstood in education. The presenters of this hands-on workshop will show that an understanding of STEM should involve the development of skills including the development of basic algorithms to collect data, then clean, analyse and interpret (all skills in the Victorian and Australian Mathematics Curriculums). The presenters will share a variety of basic data collection methods, but also share some interesting public available data sets to capture students' attention, and support them developing these crucial sets of skills. Finally, examples and discussions will be had of how this can fit into a mathematics continuum to align programming, probability and statistics with the other core skills of number/algebra that are the foundation of STEM.

## H23 Using Problem Solving to Create Differentiated Learning Experiences

**Y5 - Y8, Context for Learning, Workshop, Repeat**  
**Pauline Kohlhoff and Anne Prescott, Australasian Problem Solving Mathematical Olympiads (APSMO) Inc.**

In this workshop, we will explore how a well constructed problem can be used for teaching students who are at different stages of mathematical development, and who may exhibit different levels of mathematical achievement and confidence in their own abilities.

Questions from the Australasian Problem Solving Mathematical Olympiads and Maths Games will be used as the basis for classroom activities for students in Years 5 to 8.

The aim is to support a variety of solution strategies and further mathematical inquiry, to enhance differentiation in the teaching and learning of mathematical concepts. APSMO Inc. is a not for profit organisation. This session is open to all teachers with an interest in problem solving. Participation in APSMO programs is not assumed or required.

## H24 Creating mathematical engagement with Maths300

**F - Y6, Pedagogical Content Knowledge, Workshop, Repeat/Commercial**  
**Stephen McLeod and Laura O'Meara, Windsor Primary School**

Maths 300 is an online resource providing teachers with engaging lessons that encourage creative and critical thinking. In this workshop we will explore a Maths 300 lesson and how the lessons inspire students to develop their use of the proficiencies as they develop maths concepts and progressions of learning. We will explore how we have used this resource to ensure consistent best practice across our school. Teachers will examine the elements of a Maths 300 lesson and investigate how it has the capacity to challenge students from F - 6 giving teachers the opportunity to make connections between the primary years along with cross-curricular learning. We will investigate a sequence of lessons and discuss how these can be implemented school wide to increase both student and teacher knowledge of the proficiencies.

## H25 Targeted Teaching through a Learning Progression in Geometric Reasoning

**Y5 - Y10, Curriculum/Assessment, Workshop, Repeat**  
**Marj Horne, RMIT University University**

Come and explore some engaging activities for geometry using easily accessible materials. These activities are linked to an evidence based geometric reasoning framework of big ideas across the middle years of schooling developed by the Reframing Mathematics Futures Project based at RMIT University. Targeting teaching for students to help them think mathematically and catering for the diversity of experience within any classroom can be done easily using any of these tasks. Evidence from international studies is that Australia lags behind the rest of the world in geometry. We can make a difference to the students' futures helping them to more easily access STEM through tasks that are fun and easy to use but that focus on the important big ideas in geometric thinking. It would be useful for delegates to have some A4 paper, a ruler and a pencil.

## H26 I'm a Maths Head of Department. What should I do?

**Y7 - Y12, Networks as Communities of Practice, Workshop**  
**Andrew Kerr, Crusoe College, Caitlyn Leversha, Phoenix P-12 Community College and Oliver Lovell, Sunshine College**

Running a maths department can be a daunting undertaking. Should a new (or established) mathematics HoD choose to focus upon curriculum, pedagogy, or something else? How can meeting time be used most effectively? How detailed should curriculum or lesson plans be? And how prescriptive should a HoD be in their guidance to teachers about instructional models and pedagogical practices? How should we deal with staff who don't seem willing to change and improve?

This workshop will bring together experienced, novice, and aspiring Heads of Department to discuss these and important other questions. It will be conducted in a panel style format with questions asked to the panel, but responses from the audience also welcomed. The session will be facilitated by host of the Education Research Reading Room Podcast, Ollie Lovell.

If a strong community is formed, a follow up event may also be organised. Come with your questions ready!

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

## H27 Cartesian Coordinates Come to Life

**Y5 - Y10, Tools and Technology, Workshop, Commercial**  
**Jody Crothers, Ridge View Secondary College**

Using technology to enhance the teaching of Cartesian Coordinates.

From creating digital pictures to having the TI-Rover drawing your pictures.

You will leave this sessions with links to various resources to run these lessons in you classes. The Session uses the TI-Rover and TI-CX CAS calculators.

## H28 Movies Through a Mathematical Lens

**Y3 - Y6, Context for Learning, Workshop**  
**Toby Russo, Bell Primary School and James Russo, Monash University**

Providing an authentic hook is a powerful way of engaging students in mathematics. Building on a narrative-first approach that uses picture story books to energise mathematics lessons, we will explore how films can be used as a catalyst for rich maths investigations. Participants will have an opportunity to examine snippets from much loved films through a mathematical lens. The maths investigations we will look at, inspired by the narrative arc or characters from a film, may provide inspiration for participants to develop their own tasks based on films. So grab your popcorn and your choc top, settle in, and join us on this mathematical adventure.

## H29 Creating links between Maths and Science

**Y5 - Y8, STEM , Workshop, Repeat**  
**Rochelle Dickson and Dahliyani Briedis, Mentone Girls Secondary College**

STEM and STEAM related careers are currently receiving a lot of attention as we know that these fields are some of the fastest growing. As schools we need to develop curriculum and programs to foster the skills in these associated disciplines but more importantly the ability to use these skills to solve problems and communicate solutions. It is often difficult to know where to start when faced with such a big concept and an already full curriculum. We have begun by creating links between year 7 maths and science, working on activities or assessments that draw on skills from both areas and encouraging students to see connections between these two subjects. Participants will receive copies of all tasks and assessments which have been created.

## H30 AI - Machine Learning and Algorithmics

**Y7 - Y12, Context for Learning, Lecture, Repeat/ Commercial**  
**Craig Bauling, Wolfram Research**

For 30 years, Wolfram Research has been serving Educators and Researchers with one of the most comprehensive Statistics packages on the market. From this background Wolfram is now supporting companies around the world as they implement world leading AI strategies. From automobile vision systems, to facial recognition, to voice activated knowledge systems, to text recognition; Wolfram is the technology behind many ground breaking applications. In this talk, Craig Bauling will introduce you to the basics of AI, Maching Learning, and Algorithmics which can then be directly introduced into your classroom. Topics of this technical talk include:

- Computation using Natural English Language
- Supervised Machine Learning
- Unsupervised Machine Learning
- Reactive Learning
- Neural Networks
- Deploying a simple Machine Learning project to the WWW

The content will help attendees with no prior experience get started with the Wolfram products; product freely available to every teacher and student in Victoria. All attendees will receive an electronic copy of the examples, which can be adapted to individual courses.

Attendees may follow along with this presentation by installing Mathematica before attendance. Installation is not required, but may enhance your experience.

## H31 Crib Points

**Y1 - Y6, Context for Learning, Workshop**  
**Douglas Williams, Mathematics Centre**

Crib Points is a card game based on scoring the 400 year old game of Cribbage which still holds championships. It involves heaps of counting, counting on, addition facts, mental arithmetic and group counting to collect points. It also generates higher level maths questions. You will be introduced to the game, have time to play and will see reports from Year 1 and Year 3. Crib Points prepares the way for Cribbage in later years, which has even more ways to collect points, and that link will also be explored. A bit of fun with a lot of potential to grow fluency.

### H32 How to Teach Decimals Better

**Y5 - Y8, Pedagogical Content Knowledge, Workshop**  
**Michael O'Reilly and Norrian Rundle, Norrian Michael Maths Education**

In this session we will look at an easy to implement diagnostic test to identify common decimals misconceptions held by students. These misconceptions will be explored, as will a range of teaching strategies to address them. The concrete teaching aid, Linear Arithmetic Blocks (LABs), will be demonstrated. These can be constructed by participants and used to teach place value and decimals. Participants will receive copies of files and handouts, as well as detailed instructions for constructing the LABs.

### H33 Using Choral Counting to Promote Reasoning

**F - Y4, Context for Learning, Workshop,**  
**Amy Somers and Tahlia Bowden, Lyndale Greens Primary School**

In this session we will look at what choral counting is and how you can use it to help students to see patterns in numbers and make predictions about these patterns by using their reasoning skills.

We will also look at how students can display their learning by completing counting activities and how they can be extended to make their own counting patterns. This session will demonstrate how you can use choral counting from Prep to Year 6.

### H34 How to teach Secondary Mathematics

**Y5 - Y12, Curriculum/Assessment , Lecture, Repeat**  
**Peter Collins, Dandenong High School**

You have just got a job teaching maths – what do you do now? Things I know and use now, that I wish I knew 29 years ago.

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

The format will be a lecture, but with an emphasis on being interactive with a lot of attendee input. This session is aimed at beginning maths teachers – both inexperienced teachers and teachers who are teaching outside their area of training. It is delivered by a very experienced teacher and presenter.

### H35 ClassPad Tips and Tricks

**Y11 - Y12, Tools and Technology, Lecture, Repeat**  
**Charlie Watson, The Tuition Centre**

The 10th consecutive instance of this workshop will revisit some classic ClassPad tips and tricks relevant to upper school teachers and their students. From shift keys to sliders and eActivities to programs, we'll delve into most of the apps with the aim of working more efficiently and getting the results that we're after. Participants are welcome to bring their own ClassPad and try out tips as we go or you may prefer to just sit back, take a few notes and try by yourself later.



# SESSION I, Friday, 2.30pm-3.30pm

## I01 Multiplication: A sign of the times

**Y5 - Y10, Pedagogical Content Knowledge, Workshop, Repeat**  
**Stephen Hanlon, Braemar College**

In this practical workshop you will learn some shortcuts and alternative methods for squaring and multiplying two digit numbers. These techniques are easily used in the classroom, either as a warm-up or as a change-up to a lesson. Help your students improve their mental arithmetic and by hand processes, whilst escaping their dependence on an electronic calculator.

It is a chance to become a better mathematician or even a mathemagician! Please bring some thing to write with, and a sense of adventure.

## I02 I don't understand the question - EAL

**Y5 - Y12, Pedagogical Content Knowledge, Workshop, Repeat**  
**Sean Kelleher and Sharon Lei, Noble Park English Language School**

What makes school mathematics texts so difficult for English as an Additional Language (and other) students, and what are some ways we can help build up the academic language resources for those students?

The written and spoken language that we use in the maths classroom can be baffling to EAL students, and sometimes to all but the most literate of first language speakers. And yet it isn't always obvious to the teacher where the difficulty lies, let alone how to overcome it.

In this session we will look at:

- Some of the vocabulary and grammar difficulties common in maths questions and explanations.
- Some possible reasons that students aren't acquiring the language they need.
- Some strategies teachers can use to help students construct the linguistic resources for academic success.

Sean and Sharon are mathematics and EAL specialists at Noble Park English Language School.

A laptop or tablet capable of accessing [student.demos.com](http://student.demos.com) would be an advantage.

## I03 Free resources for delivering excellence in financial literacy

**Y7 - Y10, Tools and Technology, Workshop, Repeat/ Commercial**  
**Damian Nicholson, Financial Basics Foundation**

Financial Basics Foundation provides free of charge to all Australian secondary teachers, extensive resources and services designed to support students to develop capacity to make responsible and informed financial choices.

The Victorian Mathematics Curriculum offers a significant opportunity to use financial literacy as a context for a range of mathematical operations and applications in your classroom. This workshop will focus on exploring ESSI Money, an interactive online game which delivers an innovative app-based environment. Students practice a wide range of real life earning, saving, spending and investing transactions, and experience the financial consequences in a safe, fun and challenging way.

## I04 Footy Maths - engaging learners

**F - Y10, Context for Learning, Lecture**  
**Richard Korbosky, Dapma Pty Ltd**

This session on Football Maths involves students in looking at aspects of historical data or new happenings, solving real life maths problems which could be novel or unfamiliar problems, Interpreting data, making predictions and using tables to record the data or solve the problems presented. Activities are posted weekly/fortnightly with current up to date data and interesting social data on player and umpire statistics. This session will not ask participants to perform any calculations. Come along if you have students who are interested in footy and see what is involved in Footy maths.

## I05 Making Connections

**Y7 - Y10, Pedagogical Content Knowledge, Lecture, Repeat**  
**Mike Clapper, Australian Mathematics Trust**

The curriculum is divided up into a number of boxes, but the real richness of mathematics comes in finding the connections between the boxes! This workshop takes the form of a demonstration lesson which investigates some surprising connections between topics leading to a reinforcement of critical concepts.

## **I06 Kicking goals with Year 9 Data & AFL Fantasy**

**Y7 - Y10, Context for Learning, Lecture, Repeat**  
**Anthea Wood and Lachlan Short, Mansfield Secondary College**

For the last 4 years at Mansfield Secondary College, we have been teaching data to our Year 9 classes through the free and fantastic AFL Fantasy. Students each manage a team, make decisions on trades using statistics and compare teams by applying mathematical conditions. The data they work with is relevant to them, has a context and also generates a lot of discussion and fun! Initially created to increase school engagement, we will talk through the advantages and highs of the program, how to set it up, some of the issues you might face and we will give you the self-directed workbook that we have developed.

## **I07 Victorian Curriculum Assessment and Curriculum Made Easy**

**F - Y10, Curriculum/Assessment, Lecture, Repeat/Commercial**  
**Andrew Spitty, Essential Assessment**

Essential Assessment provides an easy and affordable way for Victorian Primary and Secondary schools to deliver a consistent and whole school approach to Victorian Curriculum Numeracy and Literacy assessment and curriculum. Essential Assessment delivers a whole school approach to summative and formative assessment and delivers an online differentiated assessment and curriculum model aligned to the content descriptions of the Victorian Curriculum. Our online assessment program assesses and develops student knowledge within each proficiency strand while delivering a consistent approach to whole school data. Our online platform creates a differentiated online curriculum to progress each students understanding within each strand, sub-strand and topic of the Victorian Curriculum!

## **I08 Function Junction – Exploring functions, graphing and coordinate geometry**

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Roger Wander, The University of Melbourne**

What happens when the graphs of linear and quadratic functions share the same axis intercepts? In this hands-on workshop, we'll use TI-Nspire CAS Navigator technology to explore multiple representations of functions, specifically the regions created near Function Junction. Estimation, ratios, function notation, algebra and calculus ideas will be covered. We'll discuss ways you can frame your pedagogy to

maintain interest and promote deeper learning for students as our findings are generalised. We'll have rulers, graph paper and calculators for those who haven't brought their own, and all files used will be available to participants. Ideally suited for teachers new to teaching Year 11 VCE Mathematical Methods using CAS.

TI-Nspire CAS CX calculators will be used and made available for participants without their own, and those with other CAS technologies will find the activity suitable for them as well. Nspire V4.5 will be used. All files will be made available to participants.

## **I09 Inquisitive, Inspiring Warm Ups**

**Y5 - Y10, Context for Learning, Workshop,**  
**Helen Haralambous, The Mathematical Association of Victoria**

A key component to engaging students is to get them hooked in at the beginning of the lesson. In this hands-on workshop, participants will explore activities that will warm up students in readiness for the lesson. The activities have potential to cater a multiple levels and engage all students.

## **I10 Embedding Reasoning opportunities in lesson structure**

**F - Y6, Curriculum/Assessment, Workshop**  
**Greg Eddy, Korumburra Primary School**

Embedding the proficiency of Reasoning into each lesson leads to valuable opportunities to engage, motivate and assess students. Using engaging low floor, high ceiling tasks, lessons can be structured so that students take ownership of their learning and also value collaborating with peers who may have different thinking to their own. This approach involves allocating time for students to articulate their thinking using correct mathematical terms and then convince others their thinking is correct. Students listening and observing are in an evaluation cycle of: What do I think about... How do others do it... and Do I need to change my view...

## **I11 Big Mathematical Ideas from Computing**

**Y9 - Y12, STEM, Workshop, Repeat**  
**Kaye Stacey, The University of Melbourne**

Digital technology is having an enormous impact on how mathematics is done. It is greatly widening the fields of application of mathematics, making it more important than ever in science, business, government and even the entertainment industry. There are new possibilities for data visualisation. Simulation of many types of behaviour supplements formula-based mathematical modelling.

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

Simple rules have been shown to underlie many of the complex patterns in nature.

The session will illustrate these ideas with highlights from three “Mathematics and Algorithmic Thinking” units for Years 9 – 11. These are freely available from the reSolve project ([www.resolve.edu.au](http://www.resolve.edu.au)). These classroom-ready units show students how computer-based mathematics complements, extends, and enriches traditional mathematical methods. Many real world examples from science, society, art, etc. are encountered.

Highlights from three units will be demonstrated. Participants who wish to follow along with their own computers should download the students’ Jupyter notebooks “Mathematics and Algorithmic Thinking” units from [www.resolve.edu.au](http://www.resolve.edu.au). The “Teacher’s Guide” in the package includes instructions on how to install the required software for off-line use. Participants who will have personal internet access could use the cloud version instead.

## I12 Euler’s Vision: Mathematics through drama

**Y11 - Y12, Context for Learning, Lecture,  
Tom Petsinis, Deakin University**

This presentation is a rehearsed reading of a dramatic work titled Euler’s Vision. The great Swiss mathematician Leonhard Euler (1707 - 83) spent the last years of his life in St Petersburg, Russia, where he died and was buried in the Alexander Nevsky cemetery. Unhindered by blindness and failing health, Euler continued his prodigious mathematical work until the very end. This dramatic piece has the blind Euler Interacting with the seven entities that comprise one of the most important formulas in mathematics:  $e$ ,  $i$ ,  $\pi$ ,  $+$ ,  $1$ ,  $=$ ,  $0$ . As with my previous work exploring mathematics through various literary genres, Euler’s Vision humanises mathematics by placing it in a cultural and historical context. Mathematics through the matrix of literature can serve as a pedagogical tool for imbuing future teachers with a deeper appreciation of the subject. Work of this kind is also important in making STEM more visible to the wider community.

## I13 Geometry + Technology = Proof

**Y9 - Y12, Tools and Technology, Lecture  
Irina Lyublinskaya, Teachers College, Columbia University**

Teaching reasoning and proofs in high school geometry is one of the challenging tasks that we face today. Can technology help us with this task? In this presentation presenter will share set of problems that uses symbolic geometry software that can be used to support development of students’ proofs skills.

This session will use symbolic geometry software Geometry Expressions. The free web version of the software has limited number of features but still demonstrate the power of this CAS-based application and can be accessed at [www.geometryexpressions.com](http://www.geometryexpressions.com). You can also download free trial version of the software.

## I14 Exploring students’ mathematical reasoning through horizon problems

**F - Y8, Context for Learning, Workshop, Repeat  
Dianne Siemon, RMIT University University**

Teacher knowledge about how mathematical ideas introduced at later stages in the curriculum are connected to ideas and strategies at earlier levels has been identified as mathematical knowledge at the horizon by Deborah Ball and others. Evidence from large scale studies suggests that students at earlier levels can tackle problems that would normally be considered appropriate for students at more advanced levels of schooling, for example, Year 4 students can solve simple proportional reasoning problems and problems involving the Cartesian Product. I’ve used the term horizon problems to refer to such problems as they provide windows into students’ mathematical reasoning that we might not be aware of otherwise. While horizon problems may be solved using familiar strategies (e.g., make-all-count-all), it is their representations that can provide valuable opportunities for making connections and noticing mathematical relationships. This seminar will explore the possibilities afforded by a range of horizon problems.

## I15 Creating links between Maths and Science

**Y5 - Y8, STEM, Workshop, Repeat  
Rochelle Dickson and Dahliyani Briedis, Mentone Girls  
Secondary College**

STEM and STEAM related careers are currently receiving a lot of attention as we know that these fields are some of the fastest growing. As schools we need to develop curriculum and programs to foster the skills in these associated disciplines but more importantly the ability to use these skills to solve problems and communicate solutions. It is often difficult to know where to start when faced with such a big concept and an already full curriculum. We have begun by creating links between year 7 maths and science, working on activities or assessments that draw on skills from both areas and encouraging students to see connections between these two subjects. Participants will receive copies of all tasks and assessments which have been created.

## I16 Using teacher feedback to shape product direction

**Y5 - Y12, Networks as Communities of Practice, Lecture, Repeat**  
**Andrew Crisp, Mathspace**

Mathspace content is currently undergoing its most significant rework since its inception. Guided by our teacher and student feedback, we have learned what hasn't been working, and what works best. From high-level restructuring of coursework to individual question overhaul and visual redesign, we have improved every aspect of the Mathspace experience - for students and teachers alike. We are very excited to show you what we have learned and what changes are in store!

## I17 What is the role of digital in building conceptual understanding?

**Y5 - Y12, Tools and Technology, Workshop**  
**Tamara Heaney, Mathspace**

Everyone talks about concept-driven, inquiry-based learning, but what does it look like in practice? What role, if any, do digital tools play in building conceptual mathematical understanding?

In this thought-provoking discussion we explore some of the big questions that teachers have when it comes to conceptual mathematical understanding.

- What is it?
- Why is it important?
- Is procedural fluency a prerequisite for conceptual understanding and mathematical proficiency?
- How can we incorporate digital platforms into our teaching practices to support a conceptual understanding of mathematics?

Contemporary curriculum experts agree that conceptual understanding is key for student success in school, but also in life generally. We'll look at how a concept-driven education develops effective approaches to teaching and learning.

## I18 Tackling issues faced in VCE Mathematics classrooms

**Y11 - Y12, Networks as Communities of Practice, Lecture**  
**Evan Curnow, Oxford University Press, Stephen Crouch, Frankston High School, Peter Karakoussis, Scotch College and Oliver Lovell, Sunshine College**

VCE Mathematics teachers face a number of issues in the classroom, from not having enough time to help individual students, to a lack of quality exam preparation material. This option will be an open discussion between a panel of VCE Mathematics teachers about how they best identify and tackle these issues. Bring your own questions, learn some effective strategies and join in the discussion!

## I19 Journaling in Mathematics education

**Y7 - Y12, Curriculum/Assessment, Workshop, Repeat**  
**Peter Breukers, Wangaratta High School**

This session will explore how you can utilise the tenets of formative assessment in Secondary Mathematics teaching in order to foster an environment of growth. I will show a classroom where learning is becoming a priority and we try, as much as possible, to remove frequent, summative testing from the Mathematics curriculum. This is being done through a combination of journaling, metacognitive activities, and structured investigations, which provide a greater emphasis on skills and processes rather than outcomes. I will also share some successes and struggles that I have come across as well as some of the reasons and research behind this approach.

## I20 Real trigonometry with real time, real world data

**Y9 - Y12, Tools and Technology, Workshop, Repeat**  
**Enzo Vozzo, Mentone Grammar**

Using real time data from the App "Flightradar24" to calculate and confirm that the speed and track of a flight is 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. Delegates will practice with each of these methods either on their calculators or on a spreadsheet.

Delegates will require the app "Flightradar24" and the real time data from flights. Calculations will be done with a calculator or preferably a spreadsheet such as Excel.

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

## I21 Using the Context of the Olympic Games to enhance the learning of Mathematics

**F - Y6, Context for Learning, Workshop, Repeat  
Pam Hammond, ROPA Consultancy**

Teachers aim to embed school mathematics in relevant and engaging contexts. The Olympic Games provides an ideal opportunity for students to experience the use of maths content that they are engaged with in the classroom, to events beyond the classroom in sporting and other contexts, as well as making connections across mathematics content and other curriculum areas. In this hands-on workshop we will see how most aspects of mathematics and the proficiencies can be included as part of a unit/program focusing on the Olympics.

## I22 Luke's Fraction Game & a Practical Fraction Unit

**Y2 - Y7, Pedagogical Content Knowledge, Workshop,  
Douglas Williams, Mathematics Centre**

Luke was a six year old when he invented this game which has since been used at several levels. It's nutty in a way, but it works. It's where the workshop will start, then we will explore more activities teachers have used to build significant, successful and practical fraction units at various levels. There is much more in their work than can be absorbed in the session, so you will be provided with links to Mathematics Centre where their experiences are recorded. As one of the teachers writes: "My practice has changed immensely! ... It is amazing and IT WORKS!"

## I23 Connections through mathematical modelling

**Y7 - Y12, Context for Learning, Lecture, Repeat  
Ross Turner and Jim Spithill, Australian Council for  
Educational Research (ACER)**

Main message: For those of us in mathematics education, the most important connections to be made are between the mathematical knowledge one holds, and the opportunities one meets to use that knowledge.

- Goes to the purpose of studying mathematics
- Motivates learning mathematics
- Provides a tool for application of relevant knowledge

This presentation will cover

- The history and operation of The International Mathematical Modeling Challenge (IMMC) internationally and in Australia

- The modelling problems used in IMMC
- Some observations on work done by Australian teams
- Some pointers to building mathematical modelling expertise among teachers and students, and as a critical part of future maths classrooms

## I24 Further More Mathematical Marvels to liven up lessons

**Y7 - Y12, Context for Learning, Workshop, Repeat  
Andrew Wrigley and Wally Brodar, Somerset College**

Building on Mathematical Marvels and More Mathematical Marvels we bring you Further More Mathematical Marvels. Enjoy another interactive and entertaining stroll through a variety of mathematical ideas in order to spark interest and discussion in the classroom. Basic number operations, algebra, geometry and probability are included, so a calculator might be useful. It is suitable for all ages up to infinity (but not beyond). Participants will be invited to share their own 'tricks of the trade'.

## I25 Widgets and UDFs in the classroom using TI-Nspire

**Y11 - Y12, Tools and Technology, Workshop, Repeat  
James Mott, Suzanne Cory High School**

In this workshop participants will learn how to make and use User Defined Functions (UDFs) and Widgets (dynamic files that can be imported into any document) on the TI-Nspire CX CAS calculator to aid your students in technology active assessment. Once participants make their own UDF and widget, they will see examples of how to incorporate widgets and UDFs within the classroom, and how students can make without adding additional burden on their workload. Participants will see examples of how to include such tasks in VCE Maths Methods and VCE Specialist Maths. Creating these resources is inherently an open-ended task and one which simultaneously provides students with an opportunity to learn the functionality of their calculator and to make their own commands and files to use in assessment. It is recommended that you bring your laptop with TI-Nspire CX CAS calculator software. TI-Nspire CAS handhelds will be available.



## I26 MOVED TO J03

### I27 Digital diagnostic assessment - be smart about planning

Y7 - Y10, Curriculum/Assessment, Lecture, Repeat/  
Commercial  
Vanessa Rule-Paddle and Lindy Sharkey, Pearson

This session explores ideas for chapter starter activities and lesson learning activities that are designed to engage middle years' learners. Chapter starters which are intriguing, inspire students to ask questions, are visually stimulating and are linked to the real world have the potential to create meaning around why we study maths. Similarly, learning activities that are contextualised and help to develop conceptual understanding are a great way to maintain student engagement. While this session is focused on years 7-10 mathematics, the pedagogy explored is applicable to other year levels

### I28 Making Connections: Making maths planning easier

Y5 - Y8, Curriculum/Assessment, Workshop, Repeat  
Jacinta Blencowe, The Australian Mathematical Sciences Institute

There are lots of connections within the curriculum which naturally fall together e.g. Area and multiplication. When we take advantage of these connections we can develop a curriculum plan that helps us to "fit everything in" and give context to student learning. Spiralling, or interleaving the curriculum, gives teachers and students the opportunity to revisit and build upon their learning.

Come and explore these concepts that can help make life easier for teachers. Play around with unit ideas that take advantage of the 'big ideas' in maths and leave with some inspirations to change the way you plan your teaching to cover the curriculum.

### I29 Are your students ready for Year 7 Maths?

Y6 - Y7, Curriculum/Assessment, Workshop, Repeat/  
Commercial  
Wendy Taylor, Mathsquad

Having strong knowledge and high confidence in basic primary maths skills is the perfect way to start high school. Unfortunately for many students this is not the case. In this session I will answer the following questions and much more; What are the key primary maths skills that underpin success in high school? How can students improve their knowledge of

these skills within an already crowded curriculum? How can we improve retention of the skills students are learning?

This session will also introduce the "Mathsquad Challenge", a program for students in Year 6 and Year 7 that will run during the month of February in 2020. For more information head to [mathsquad.org/challenge](https://mathsquad.org/challenge).

For more information on Mathsquad's free and paid for resources and services please head to [Mathsquad.org](https://mathsquad.org).

### I30 Differentiation in the primary classroom: Problem-solving prompts

F - Y6, Networks as Communities of Practice, Lecture  
James Russo, Monash University and Michael Minas, Love Maths

Perhaps the most challenging aspect of teaching mathematics to children of any age is the wide range of abilities present in any given classroom. One means of addressing this issue is to teach mathematics through problem solving, and use enabling and extending prompts to differentiate instruction. However, how should such prompts be used? Can teachers support students to take charge of their own learning, and access supporting (and extending) materials when required? In this workshop, we will present some recent classroom-based research into student attitudes towards prompts, and how the actions of teachers can shape these attitudes. In addition, we will share some strategies we have found effective for supporting students to use prompts effectively. Finally, participants will be provided with opportunities to engage with several challenging tasks, and develop their own prompts that they believe could effectively support (or extend) student learning.

### I31 BYOD - Is it worth it?

Y7 - Y12, Tools and Technology, Lecture  
Ro Bairstow, King's College

Ro will outline how his school has implemented a BYOD (iPad) scheme and the impact it has had on his classroom teaching and learning, and on his students achievement and attitude. He will demonstrate some of the resources; eBooks, apps, websites and games, that he has found useful, some of which he has written himself.

Finally he will deliver the verdict.

### **I32 Algebra for All even 6 year olds**

**F - Y2, Pedagogical Content Knowledge, Workshop,  
Repeat Courtney Chalmers and Sarah Finnegan ,Christ  
the Priest Primary School**

WOW! Young children engaging in generalising and making connections with other mathematical concepts. If you doubt that this is possible then this presentation is for you!

This session will showcase the Pattern and Structure Mathematical Awareness Program (PASMMap) for children in the first 3 years of formal schooling (F- 2). The Program is based on research evidence undertaken by Joanne Mulligan and Michael Mitchelmore. It is organised as a series of learning sequences each of which consists of a number of learning experiences focused on one or more early mathematical structures. These learning sequences are grouped into multiple learning pathways showing that visualising and developing mental pictures provides the foundation for deeper learning and understanding of related and interrelated mathematical concepts.

Practical examples of the following pedagogical practices: Modelling, Representing, Visualising, Generalising and Sustaining will show how to engage young children in generalising.

### **I33 Scaffolding Mathematical Reasoning for Junior Secondary**

**Y7 - Y8, Pedagogical Content Knowledge, Lecture,  
Repeat/Commercial  
Carolyn Smales and Joel Townsend, Firefly Education**

Discover a simple and logical method for teaching students how to approach mathematical reasoning. Too often, students transition from primary to secondary school without having been taught how to reason mathematically. When asked to complete problems or inquiries that require them to apply reasoning skills, such as “proving”, “explaining”,

“generalising”, or “justifying”, they don’t know what to do. In this presentation, you will learn how to scaffold a meta-cognitive approach to reasoning, that will not only help students to unpack and solve complex reasoning questions, but also communicate their answers appropriately - an essential skill for life beyond the classroom.

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

## **I-J01 Algorithmic Thinking in the Classroom: What, Why, How?**

**Y5 - Y10, Tools and Technology, Workshop**  
**Sebastian Sardina, RMIT University**  
**Max Stephens, The University of Melbourne**

Digital technologies have changed the way we live, study and work, transforming our lives, cities and industries. Artificial Intelligence techniques are being applied to sectors as diverse as healthcare and manufacturing. Similar techniques are increasingly being used for crisis response, environmental challenges, infrastructure management and public policy-making. In all cases it's "just" algorithms. In an algorithmic-driven world, it becomes vital to provide students with the necessary skills to go beyond the mere consumption of technology, and move into critical judgment and creation. In this interactive workshop, we will talk about algorithmic thinking as step-by-step cognitive strategy to problem-solving that is cornerstone in all coding programs today. We will discuss its main ingredients and benefits, and provide practical strategies to introduce it into middle-years classrooms. Participants will explore several take-away algorithmic activities, from unplugged exercises to simple coding games (e.g. light-bot) to coding using Scratch and Python. Please bring iPad. This is an interactive workshop.

## **I-J02 The beginning secondary mathematics teacher.**

**Y7 - Y12, Pedagogical Content Knowledge, Workshop**  
**Rob Vermay**

An experienced, now-retired secondary mathematics teacher, shares a range of ideas, strategies, and resources that may be of interest to beginning teachers of mathematics. This seminar will explore a number of issues of interest to new teachers including motivating students, common errors, class and time management, activities and resources, settling into a new school etc. Other issues may arise during the session and will also be addressed. Participants will be encouraged to share their own concerns and ideas.

## **I-J03 A day in the life of a Mathspace teacher and student**

**Y7 - Y12, Tools and Technology, Workshop, Repeat/Commercial**  
**Craig Blake, Mathspace**

What's a day in the life of a Mathspace teacher and student like? We've created a workshop for teachers that are new to Mathspace and want to experience what it's like teaching and learning on Mathspace.

As a student, you'll get to try your hand at an adaptive task and experience what it's like getting step-by-step formative feedback as you work. Then you'll dive into one of our diagnostic tests and see how we measure your performance against curriculum outcomes.

As a teacher, you'll get to create a task, and measure your own results on the diagnostic. This is an interactive session, so you will need to bring along a Wi-Fi enabled device (e.g. laptop, tablet / iPad)

# SESSION J, Friday, 3.40pm-4.40pm

## J01 Connecting Mathematics through Rectangles & Squares

Y4 - Y10, Pedagogical Content Knowledge, Workshop  
Douglas Williams, Mathematics Centre

There is too much mathematics linked to rectangles and squares to explore it all in one session, but at least we will find our way from rectangles to squares ... to square numbers ... to square roots without the square root button ... to area of circle without pi. On that pathway we should be able to take in long multiplication and a bit of algebra. The expectation is that there will be something new and intriguing for everyone. If time is available we can point the way to other related topics such as patterns and Pythagoras.

## J02 My Students Don't Know Their Tables!

Y5 - Y10, Tools and Technology, Workshop, Repeat/  
Commercial  
Michael O'Reilly and Norrian Rundle, Norrian Michael  
Maths Education

Too many students in the Middle Years do not have automatic recall or even efficient strategies to work out the Multiplication Facts. Too often, students resort to counting on their fingers, using the 'tables' on the back of their exercise book or calculators. This session will look at an alternate representation of the 'times tables', with associated efficient strategies for learning the Multiplication Facts. In this option you will be shown how to effectively teach the Multiplication Facts to Middle Years students who do have automatic recall. Excel spreadsheets will also be provided that enable targeted practise using efficient strategies. Although this is a Commercial Session, the ideas and teaching strategies covered in this session can be implemented in your classroom without purchasing the Times Tables Strategies App from the Apple Store.

## J03 Creating Widgets for Senior Mathematics

Y11 - Y12, Tools and Technology, Workshop  
Neale Woods, Virtual School Victoria

TI-Nspire widget is an application that allows the user to access additional material within their current document. In this 'hands on' session, participants will have the opportunity to create their own widgets as well as accessing sample widgets. The specific focus of the session will be on creating widgets for use in external examinations. TI-Nspire CAS handhelds will be provided but participants are encouraged to bring their own, including laptops with the TI-Nspire software.

## J04 Developing Further Mathematics SAC tasks

Y11 - Y12, Curriculum/Assessment, Lecture, Repeat  
Kevin McMenamin, Mentone Grammar

The mathematics study design 2016 - 2020 requires an open and explorative approach to developing SAC material that ensures the tasks are application, modelling or problem-solving in nature and not just an extended collection of Examination 2 questions. This session gives you the opportunity to explore starting points and create the skeletal detail for the tasks you would use in 2020. We will look at a selection of application and modelling/problem solving starting points that will act as stimulus material to initiate discussion and then provide the focus of the investigations.

## J05 Getting the Most From FX Draw

Y7 - Y12, Tools and Technology, Lecture, Commercial  
Paul Hooper, Efofex Software

This lesson is designed to help you get the most out of FX Draw. We will be concentrating on providing tricks and tips that will make you much more productive with the software, even if you are a 'guru'. We will also present some of the newer features that you may not have seen. Finally, we will also present some new ways of using FX Draw to support online accessible teaching as well as in-class demonstration. If you only use FX Draw to insert diagrams into Word, you will discover a host of new ways to use your FX Draw knowledge.

The session will include question and answer sections and our sessions are modified dynamically to suit the needs of the participants. We guarantee that you will leave the session having learned something that will save you time.

While it is not necessary to have your notebook computer with you for this session, it can be helpful. We recommend that you have the latest version of FX Draw installed if at all possible.

## J06 Chance, Data and the Gambling Issue

Y9 - Y10, Context for Learning, Workshop, Repeat  
Robert Money

Try out some realistic gambling simulations with an average return to player (equals price x probability) of always less than 95%. See how the longer you play the more certain you are of losing all your stake. Tease out common misunderstandings and confront them with the key message 'Chance has no memory'.

See how these simulations can be used as an engaging way of covering all the probability content of the Year 9/10 curriculum.

See how real gambling data – from the local pokies venue to the Australia-wide context – can be easily accessed by students for use in the calculation and representation learning activities of the Year 9/10 statistics curriculum.

Discuss effective ways of dealing with the gambling issue in Year 9/10 classrooms. Organise to get access to all the resources used in the session.

### **J07 MAWA Competitions & Resources for Reciprocal Members**

**F - Y10, Pedagogical Content Knowledge, Workshop, Repeat**  
**John West, MAWA / Edith Cowan University**

In this presentation John will share his experiences from the inaugural AAMT Singapore tour in April 2019, discuss MAWA's popular Have Sum Fun and Have Sum Fun Online competition formats, and explore a range of newly-developed resources for competition mathematics, hands-on teaching and learning, beginning teachers, and parents.

### **J08 Investigating Integer Square Roots of Complex Numbers**

**Y11 - Y12, Pedagogical Content Knowledge, Workshop, Repeat**  
**Ray Williams and Katie Bye, St Marks Anglican Community School**

Suppose  $\sqrt{a+bi} = c + di$  where  $a, b, c$  and  $d$  are all integers.

Under what conditions will this occur? This session begins with determining what these conditions are and then extending the investigating to determine how these conditions link to a particular sequence of prime numbers (also linked to Gaussian primes) and primitive Pythagorean triples.

### **J09 Valuing student work in mathematics at Camberwell High School**

**Y7 - Y12, Curriculum/Assessment, Workshop, Repeat**  
**Geoffrey Menon and Ursula Parker, Camberwell High School**

We will present the ways in which we specifically demonstrate to students the value of their work from year 7 through to year 12. This is achieved through a mix of creative assessment pieces, open-ended problem solving and presentation and through feedback to students.

### **J10 MathsCraft – working like a mathematician!**

**Y4 - Y10, STEM, Workshop, Repeat**  
**Jacqui Lee, Ruyton Girls' School**  
**Anita Ponsaing, ARC Centre of Excellence for Mathematical & Statistical Frontiers (ACEMS)**

A MathsCraft workshop, sponsored by ACEMS, enables participants to explore, discover and describe mathematical structures for themselves. Students explore, make conjectures, prove or disprove those conjectures, figure out 'why'... and in doing so get a sense for what makes mathematicians love maths! Come and experience one of the sessions and learn more about program, and see what it's like to 'do maths like a research mathematician'.

MathsCraft is the flagship outreach program of ACEMS, the Australian Research Council Centre of Excellence for Mathematical and Statistical Frontiers.

### **J11 Tips for using TI Nspire CAS effectively in Further Mathematics**

**Y9 - Y12, Tools and Technology, Workshop, Commercial**  
**Danijela Draskovic, The Mathematical Association of Victoria**

Are you teaching Further Maths for the first time? Have you taught the subject before but want more experience with the TI Nspire technology? If so, come along to this workshop where I will be covering the main applications of CAS technology in the Further Maths course. I will give you tips on increasing the precision and efficiency with the help of the TI Nspire CAS. I will also demonstrate how the technology can help students make connections between the theoretical concepts and real-world applications. If possible, please have access to a TI Nspire CAS handheld device, or the laptop software

### **J12 More Maths games to engage students**

**Y5 - Y10, Context for Learning, Workshop**  
**Helen Haralambous, The Mathematical Association of Victoria**

Maths Games are a fantastic way of engaging & enthusing students. This can be seen through the popularity of the MAV Games Days, which provide an avenue for students to compete with like-minded individuals. The games are also a useful tool in engaging all students. In this hands on workshop participants will trial a selection of games and activities, some typical Games Day samples for schools wishing to run smaller scale Games Days at a local level, all applicable to the classroom as tools for engaging all students.



# SESSION J, Friday, 3.40pm-4.40pm (cont.)

## J13 Using Computers in a Maths Classroom with Year 7-10 Students'

**Y7 - Y10, Tools and Technology, Lecture, Repeat/Commercial**  
**Robert Rook, Mathplot**

This session will run through using technology (Mathplot) in the classroom for Years 7-10. Among the topics covered are graphing, consumer maths, fractions, geometry, measurement, mensuration, percentage, plotting, spatial relations, statistics, tessellations, trigonometry, probability to name a few.

The maths tutor, topic revision/test program, and homework book generator software will be explained. All attendees will receive a free registered copy of the latest programs for their home computers. Downloads available from [www.mathplotplus.com](http://www.mathplotplus.com)

## J14 Enhancing student voice through problem solving and inquiry

**F - Y6, Context for Learning, Workshop, Repeat**  
**Nadia Walker, Aspendale Gardens Primary School**

Enhancing student voice in mathematics depends on a few key factors, including a classroom culture of problem solving and inquiry, honouring all student efforts, encouraging students to be partners in the learning and setting high expectations for engagement and ownership. This hands-on workshop will offer tasks, look at student work samples and videos, as well as provide guides and protocols to assist in setting up a classroom that honours student voice.

## J15 Mathematical Modelling in the Middle Years

**Y5 - Y10, Pedagogical Content Knowledge, Workshop**  
**Bernadette Mercieca, Australian Catholic University**

Mathematical modelling is an important skill for middle years students to develop. Whilst similar to problem solving in being in a real-world context, mathematical modelling differs from this in that students, working in a small group, need to formulate their own problems from a stimulus and based on the assumptions they make. This is a new and challenging way of approaching Mathematics for many teachers. However, as Stillman (2010) suggests, "problem posing is of central importance in the discipline of mathematics and in the nature of mathematical thinking and it is an important companion to problem solving (p. 42)." This workshop will help middle years teachers explore the process involved in setting up a modelling exercise with their class. AAMI's ReSolve website

will be used to demonstrate different modelling activities and participants will have the opportunity to explore a modelling activity for themselves. Please bring your laptop or Ipad.

## J16 Using the e5 Instructional Model in Maths

**F - Y6, Curriculum/Assessment, Workshop, Repeat**  
**Nichole Skews, Eastwood Primary School**

The e5 Instructional Model has been a feature of effective classroom practice for many years as it utilises the features of inquiry based learning. Using an inquiry model to teach Mathematics enables students to engage, explore, explain, elaborate and evaluate their mathematical thinking and skills. This presentation, will share how Eastwood Primary School and Deaf Facility reinvigorated our whole school Maths program by implementing the e5 model. The result of this being a dramatic increase in student engagement, productive student discussion around mathematical thinking and reasoning and a deeper understanding of concepts. In this practical workshop, participants will gain an understanding of the e5 model and the process used to plan and deliver this model of instruction.

## J17 An alternative approach to introduce the equal sign

**F - Y4, Curriculum/Assessment, Lecture, Curriculum/Assessment**  
**Jiqing Sun, Deakin University**

In recent decades, researchers have documented that many students have narrow conception of the equal sign, which is viewing it as a one-directional 'show result' symbol. In this presentation I will showcase how an equal sign is introduced in Chinese schools to develop students' relational understanding of it. Four features of the Chinese approach will be discussed:

- introducing the equal sign before the traditional arithmetic operations;
- an instructional sequence that starts from students 'existing mental image';
- the highlight of the way of drawing an equal sign; and
- the emphasis of 'two-sides' sense. I will also discuss how this approach could be accommodated into the Australian Curriculum, to give junior-primary teachers a suggestion of how to introduce the equal sign in their everyday classroom practice.

## J18 Making Connections in Early Years Through Games

**F - Y4, Context for Learning, Workshop**  
**Amy Somers and Nikki Barker, Lyndale Greens Primary School**

In this session we will discuss and play a number of games designed to help students build their mental model of numbers while also helping them to make connections to other areas of mathematics such as ten facts, double facts, shape and graphing.

## J19 Coding in the Maths Classroom

**Y7 - Y10, Tools and Technology, Workshop, Repeat**  
**Georgia Gouros, Virtual School Victoria**

Exploring student cognition in the Maths classroom. Can students develop a deeper understanding of Mathematical concepts through targeted coding activities in the classroom? This workshop will provide teachers with ideas about how to introduce the use of coding using block based SNAP <https://snap.berkeley.edu/>, and text base Python <https://www.python.org/> programming languages with Maths students to:

- find pi by approximation, using Archimedes method
- find primes using Eratosthenes sieve method
- generate permutations/combinations

These activities are designed to expose students to numerical methods that they can create or replicate to help their understanding of their application.

## J20 ADUSU ALGEBRA Concrete Materials assisting understanding

**Y7 - Y10, Tools and Technology, Workshop, Repeat/Commercial**  
**Ruth Adusu, Adusu Algebra**

Adusu Algebra is a concrete materials kit developed by full-time Mathematics teacher Ruth Adusu who has over 30 years' experience in the classroom. It allows students to physically build and manipulate expressions, equations and inequalities. By bringing algebra "out of the abstract and into the concrete" it avoids or eliminates common misunderstandings, provides immediate feedback, supports correct mathematical working, simplifies algebraic processes, allows students to explore questions, and improves recall. Differentiation is also facilitated by the use of Adusu Algebra.

Participants will use a student kit to complete a variety of

questions to experience for themselves the value of having a hands on tool for algebra. We will discuss common misunderstandings and how language and notation can mislead or confuse students.

Even if participants do not purchase this product, attending this session will give teachers fresh insight and provide strategies to better equip their students to approach algebra with confidence.

## J21 Using the Context of the Olympic Games to enhance the learning of Mathematics

**F - Y6, Context for Learning, Workshop, Repeat**  
**Pam Hammond, ROPA Consultancy**

Teachers aim to embed school mathematics in relevant and engaging contexts. The Olympic Games provides an ideal opportunity for students to experience the use of maths content that they are engaged with in the classroom, to events beyond the classroom in sporting and other contexts, as well as making connections across mathematics content and other curriculum areas. In this hands-on workshop we will see how most aspects of mathematics and the proficiencies can be included as part of a unit/program focusing on the Olympics.

## J22 Developing Number Sense P-2

**F - Y4, Pedagogical Content Knowledge, Workshop, Repeat**  
**Kerri Smith, Fish Creek and District Primary School**

Students in the senior primary grades who struggle with Maths often lack number sense. This session will focus on exploring the four crucial aspects of number sense that students in the early years of school need to develop to become competent mathematicians, namely: subitising small quantities, recognising 1 and 2 more/less, benchmarking quantities using 5s, 10s and 50s and exploring the part/part/whole relationship between numbers. We will then look at a variety of ways to engage students in learning these skills in a fun and engaging way. Links will be made to the mathematical proficiencies with lots of take-away ideas that can be easily adapted to accommodate different levels of ability. Participants will get a PDF with the games included, ready to use.

# SESSION J, Friday, 3.40pm-4.40pm (cont.)

## J23 Brain Training Maths Card Games

**F - Y10, Pedagogical Content Knowledge, Workshop,  
Repeat/Commercial  
Richard Korbosky, Dapma Pty Ltd**

These maths card games develops a player's thinking because players are quickly calculating in their heads. It is brain training activity because a player needs to adjust to the changing mathematical representations shown on the cards. The mathematics representations are shown in pictures, words or numbers and players are switching from one representation to another. There are 12 different maths card games. The maths card games improve students' fluency, understandings, estimation, basic facts, addition, subtraction and multiplication across a number of different mathematical ideas using different representations. The rules for the playing the games are easy and the same rule is be applied to the 12 different packs which are suitable for pp - Yr. 10. The range of maths cards games allows the teacher to differentiate the classroom and allows students to self-improve their response times to many mathematical ideas that they are learning in maths.

MAV is a highly active association with over 450 individual members, and nearly 900 institutional members, including schools. This provides membership benefits to a growing network of over 13,500 mathematics educators.

MAV supports its members by working with experts including leading education academics and researchers, education consultants, exemplary classroom teachers, the Victorian Department of Education, The Victorian Curriculum and Assessment Authority (VCAA), and various education partners to provide services in the interests of members and the wider community.

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- In school consulting
- Professional advice
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- Primary and early childhood conference
- Student activities
- Newsletters, magazine and journals
- Publications and resources through MAVshop
- Advocacy and representation

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- Institutional member (primary and secondary schools and early childhood centres)
- Associate member (industry partners or resource providers)

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

## HOW I CAN I GET INVOLVED IN THE MAV?

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

- present at MAV's annual conference
- join one of our networks, or start your own with MAV support
- write for MAV journals
- join committees and working parties
- develop resources
- pilot mathematics initiatives
- develop a PD event at your school or venue
- judge the MTQ awards, or
- organise a maths games day for your region.

## MATHS ACTIVE ACCREDITATION FOR YOUR SCHOOL

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

- Publicise your schools Maths Active Schools certification and demonstrate to your school community that mathematics is enjoyable and highly valued.
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- Be invited to participate in special Maths Active School events.





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**Oliver Wurm**

Permanent Opportunities Consultant – Maths & Science  
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The background features a complex, abstract geometric pattern of blue and white lines. The pattern consists of multiple concentric, interlocking shapes that create a sense of depth and movement. A large, solid white circle is centered in the composition, serving as a focal point for the text.

**PRESENTER  
LISTING**

# PRESENTER LISTING A-Z

Nadia Abdelal: D26, H20  
Ruth Adusu: G21, J20  
Crystal Afitu: B08, G07  
Amie Albrecht: B23, E21, G25  
Scott Allder: E27  
Rodney Anderson: G38  
Mike Askew: A01, F01  
Belinda Atkin: G28  
Michael Bairstow: E18  
Ro Bairstow: I31  
John Bament: C25, H12  
Nikki Barker: J18  
Vaughan Barras: D16  
Craig Bauling: B34, H30  
Len Bedier: D38, G12  
Craig Blake: B-C08, D27, H15, I-J03  
Jacinta Blencowe: D35, I28  
Janette Bobis: F02  
Anna Bock: D26, H20  
Helen Booth: D24, H18  
Jennifer Bowden: E31, G-H04  
Tahlia Bowden: H33  
Laura Boylan: D22  
Peter Breukers: E28, I19  
Dahliyani Briedis: H29, I15  
Jen Briggs: G27  
Wally Brodar: B10, I24  
Sarah Buckley: A05  
Ian Bull: B26, E22  
Katie Bye: B37, E37, G36, J08  
Tim Byrne: E41  
Ashley Carlton: E27  
Deb Carmichael: C32, E32  
Neil Carmona-Vickery: A05  
Tim Carruthers: D39, G34  
Jessica Carter: D18  
Marissa Cashmore: B02, G01  
Toen Castle: B27, C16, E23  
Courtney Chalmers: G31, I32  
Yew Fook Chan: E26  
Jill Cheeseman: A02  
Mike Clapper: B18, D14, G15, I05  
Peter Collins: G23, H34  
Narcisa Corcaci: D-E02  
Ellen Corovic: B20, D-E03, G-H06  
Linda Cranley: D33  
Andrew Crisp: E25, I16  
Robyn Crockett: G17  
Jody Crothers: E14, H27  
Stephen Crouch: E38, G35, I18  
Evan Curnow: I18  
Paul Dann: B-C02, D-E01  
Aylie Davidson: B07, G04  
Shane Dempsey: D37, E36  
Emily DiBella : C08, H06  
Rochelle Dickson: H29, I15  
Danijela Draskovic: B-C05, D-E04, J11  
Mark Drummond: D25, H19  
Greg Eddy: I10,  
Catherine Epstein: C21, E24  
Michaela Epstein: D20, G25  
Heather Ernst: G11  
Matthew Ferguson: C04  
Liam Ferris: D25, H19  
Sarah Finnegan: G31, I32  
Lana Fleiszig: B-C03  
Aimee Flemming: D-E03  
Peter Flynn: C27  
Rebecca Forder: B30, G14  
Peter Fox: B24, D-E05, G10  
Sue Gardiner: B19, G19, H09  
Kristie Gibson: B-C03  
Mark Gleeson: G22  
Wendy Goff: G05  
Steven Goldberg: D15, G16  
Peter Goss: A05  
Georgia Gouros: B09, J19  
Bozena Graham: C33  
Madeleine Graham: D15, G16  
Stan Grazotis: H16  
Jess Greenbaum: G26, H11  
Judy Gregg: G02  
Genovieve Grouios: B22, E01, G02  
Echo Gu: D11, G13  
Natalie Gugger: G06  
VJ Gunawardana: B15  
Leonie Hagggett: C26  
Pam Hammond: I21, J21  
Stephen Hanlon: D01, I01  
Helen Haralambous: B-C05, D-E04, I09, J12

Tamara Heaney: C14, I17  
 John Hein: B30, G14  
 Gregory Hine: D33  
 Hilary Hollingsworth: F04  
 Martin Holt: E24  
 Paul Hooper: B11, J05  
 Marj Horne: C03, H25  
 Bryn Humberstone: B29, E11, G24  
 Chris Ireson: D38, G12  
 Andrew Jefferies: B13  
 Peter Jones: B-C04, G-H03  
 Penelope Kalogeropoulos: E19  
 Peter Karakoussis: I18  
 Sean Kelleher: D02, I02  
 Vicky Kennard: B12, G08  
 Andrew Kerr: H26  
 Rebecca Kerr: B30, G14  
 Bernard Kerrins: C05, H03  
 Pauline Kohlhoff: D29, H23  
 Richard Korbosky: B14, C07, I04, J23  
 Adam Kruger: B39  
 Kate Lachmund: E13  
 Melissa Lake: G18  
 Stacey Lamb: D09  
 Lauren Lamont: C18, H14  
 Dean Lamson: B01  
 Brian Lannen: C24, E05  
 John Lawton: H21  
 Jacqui Lee: C38, J10  
 Sharon Lei: D02, I02  
 Antje Leigh-Lancaster: E08  
 David Leigh-Lancaster: B08, G07  
 Christopher Lenard: C16  
 Caitlyn Leversha: H26  
 Dianne Liddell: B03, H01  
 Angela Liyanage: E19  
 Michael Llewellyn: D16  
 Eadaoin Lorigan: D04  
 Oliver Lovell: G25, H26, I18  
 Jim Lowe: G38  
 Cassandra Lowry: D03  
 Julian Lumb: E08  
 Alastair Lupton: C37, H02  
 Irina Lyublinskaya: D-E07, G-H05, I13  
 Aline MacDonald: E12  
 France Machaba: E17  
 Mandi Mackey: C21  
 Laura MacLean: B02, G01  
 Mayamiko Malola: D13  
 Cassandra Marinopoulos: F03  
 Geoff Masters: A03  
 Russell McCartney: C06  
 Sara McKee: G18  
 Stephen McLeod: D30, H24  
 Leanne McMahan: D24, H18  
 Heather McMaster: E03  
 Kevin McMenamin: D32, E02, G33, H04, J04  
 Allason McNamara: B01, C01  
 Geoffrey Menon: B38, J09  
 Bernadette Mercieca: D06, J15  
 Sanjeev Meston: C12, G-H02  
 Jess Mikecz: D08, H05  
 Karen Milkins-Hendry: C32, E32  
 Michael Minas: G26, H11, I30  
 Robert Money: D36, J06  
 Claire Moriarty: C10  
 Anna Morton: G11  
 James Mott: B32, I25  
 Frank Moya: D31, E33  
 Bill Murray: C09, D40  
 Daniel Nadjidai: E13  
 Damian Nicholson: I03, C02  
 Karim Noura: G09  
 Greg Oates: F05  
 Michael O'Connor: C19  
 Laura O'Meara: D30, H24  
 Leah O'Neill: B-C01, G-H01  
 Michael O'Reilly: B35, E35, H32, J02  
 Juan Ospina León: D28, H22  
 Mary Papp: C01  
 Ursula Parker: B38, J09  
 Nathalie Parry: C17, H13  
 Renee Patel: C18, H14  
 Michael Payne: B27, E23  
 Catherine Pearn: B17, D13  
 Tom Petsinis: I12  
 Trang Pham: C23  
 Geoff Phillips: C30, E04  
 Ann Phillips: C30, E04  
 Simon Pitaro: E09, G20  
 Anita Ponsaing: C38, J10  
 Anne Prescott: D29, H23

# PRESENTER LISTING A-Z (cont.)

Lee-Anne Pyke: B05, G-H06

Natalie Raspudic: E09, G20

Ellen Rennie: G-H04

Mike Ristovsky: B13

Angela Rogers: D23

Robert Rook: B21, E40, H10, J13

Raymond Rozen: D37, E36

Vanessa Rule-Paddle: C35, D39, G34, I27

Norrian Rundle: B35, E35, H32, J02

James Russo: H28, I30

Toby Russo: H28

Kerryn Sandford : B-C07

Sebastian Sardina: A05, I-J01

Dietmar Schaffner: C20

Zoe Schaffner: E12

Katherine Seaton: C16, D17

Jade Seddon: G27

Wayne Semmens: E07, H07

Lindy Sharkey: C35, I27

Lachlan Short: H08, I06

Dianne Siemon: B-C06, E20, I14

Nichole Skews: C15, J16

Kylie Slaney: A05

Carolyn Smales: G30, I33

Kerri Smith: E10, J22

Trevor Smith: D11, G13

Kate Smith-Miles: A04

Melissa Sokol: B-C03

Amy Somers: C26, H33, J18

Jim Spithill: C11, I23

Andrew Spitty: C28, D19, G29, I07

Kaye Stacey: E16, I11

Paul Staniscia: B06, C40

Megan Steel: D18

Dan Steele: B03, H01

Max Stephens: B17, D13, I-J01

Ian Stevens: D05, E30

Brian Stokes: B28, C39

David Sukh: G28

Peter Sullivan: C13, D12

Jiqing Sun: J17

Philip Swedosh: B01

Tanya Tanner: D04

Wendy Taylor: B31, I29

Tim Teague: H16

Chris Terlich: C06

Dave Tout: B25, D-E06

Penelope Townley: G28

Joel Townsend: G30, I33

Ross Turner: C11, I23

Rob Vermay: I-J02

Pam Vilsten : C04

Rob Vingerhoets: G39

Enzo Vozzo: E29, I20

Nadia Walker: D07, J14

Roger Wander: E15, I08

Charlie Watson: B36, C34, H35

John West: C36, J07

Chris Wetherell: E06

Katie White: B29

John Widmer: D28, H22

Amanda Williams: D22

Bruce Williams: G06

Douglas Williams: B16, C31, D10, E34, G32, H31, I22, J01

Ray Williams: B37, E37, G36, J08

Rosalind Willsher: C08, H06

Ian Willson: E39, G37

Ian Wong: D34

Anthea Wood: H08, I06

Neale Woods: B33, J03

Andrew Wrigley: B10, I24

Michael Younger: D22

Elena Zema: C29, D21

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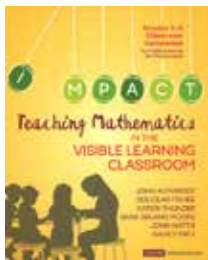
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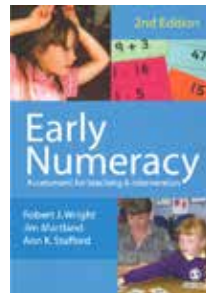


## TEACHING MATHEMATICS IN THE VISIBLE LEARNING CLASSROOM

3-5

How do you generate that lightbulb 'aha' moment of understanding for your students? This book helps to answer that question by showing Visible Learning strategies in action in high-impact mathematics classrooms. Learn from teachers as they engage in the countless micro-decisions required to balance strategies, tasks, and assessments.

\$46.77 (MEMBER)  
\$58.46 (NON MEMBER)



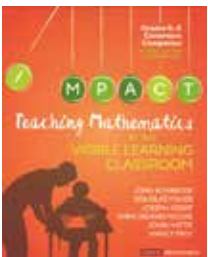
## EARLY NUMERACY ASSESSMENT FOR TEACHING AND INTERVENTION (SECOND EDITION)

F-4

This book details the background and effectiveness of the highly regarded 'Mathematics Recovery' early intervention program, incorporating an interview-based approach to assessing young children's numerical knowledge and strategies. Developed in Australia and internationally regarded as a substantial contribution to the field, this work also formed the basis of the 'Count Me In Too' program.

The book includes six diagnostic interview schedules focussing on a range of aspects of early number, and sets out procedures for analysing the results of the assessment interviews together with a comprehensive framework (the Learning Framework in Number) for determining a child's strategies and documenting current levels of a child's knowledge.

\$62.71 (MEMBER)  
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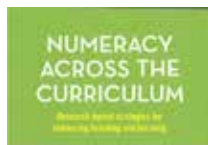


## TEACHING MATHEMATICS IN THE VISIBLE LEARNING CLASSROOM

6-8

Select the right task, at the right time, for the right phase of learning. A decision-making matrix and grade-level examples help you leverage the most effective teaching practices at the most effective time to meet the surface, deep, and transfer learning needs of every student.

\$45.08 (MEMBER)  
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## NUMERACY ACROSS THE CURRICULUM

F-VCAL

A guide for pre-service teachers on understanding numeracy and its application in both primary and secondary schooling.

Being numerate involves more than mastering basic mathematics. Numeracy connects the mathematics learned at school with out-of-school situations that require capabilities such as problem solving, critical judgment, and sense-making related to non-mathematical contexts. This book provides prospective and practising teachers with practical, research-based strategies for embedding numeracy across the primary and secondary school curriculum.

\$42.24 (MEMBER)  
\$52.80 (NON MEMBER)



## HOW THE SUN GOT TO COCO'S HOUSE

F-6

This is an enchanting story about the sun, and how it makes its journey from the far side of the world to the home of one small girl. The sun rises up behind a snowy peak and casts its mellow dawn light for the wandering polar bears. It skims across the icy water, touching a fisherman's hat and catching for a moment in the eye of a whale. It beams through the trees of frozen forests and makes shadows in a little girl's footsteps before gliding over cities, darting down lanes and waiting patiently for an old lady to open her window. The sun races through the countryside, greeting snow cats and bears. High over a desert it meets the rain in a halo of colours. The sun leaps whole countries, chasing the night, before bursting at last in a fanfare of warm golden light through Coco's window!

\$21.11 (MEMBER)  
\$26.39 (NON MEMBER)



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