

Masterclass 1: 8:00-11:00

PROBLEMO – Australian Maths Trust (Janine Sprakel)

Problemo is the AMT online platform for teachers - packed with quality maths problems of varying difficulties, aligned to the Australian Curriculum. Teachers can search and filter problems to work through in class, or set quizzes for students to do individually. Problemo is perfect for delivering lessons remotely. In this Masterclass, Janine Sprakel – National Partnerships and Engagement Manager at AMT, will walk participants through the Problemo platform. All teachers taking part in the masterclass will be given short-term access to Problemo Plus and will have the opportunity to work together virtually to select problems and plan for their use in the classroom. We will look at the research base for including problem solving in your repertoire, and the things teachers can do to implement problem solving to grow student capacity.

Please create a Problemo account before the session. If you already have a Problemo account, login at the time of the MasterClass at <https://app.problemo.edu.au/user/login> If you don't have an account, you can register at <https://app.problemo.edu.au/user/register> using your school affiliated email address in the days before the session.

The Australian Maths Trust (AMT) is a charity that helps teachers with resources and opportunities to enable their students to develop their problem-solving skills. AMT is best known for its extensive range of maths, STEM, computational and algorithmic competitions and programs – from one-day events, like the Australian Mathematics Competition through to teacher-led programs that run over a series of weeks or months.

Janine Sprakel works with teachers all over Australia to grow their confidence and capacity in the teaching and learning of mathematical problem solving.

Concurrent Workshops 1 (55min)

Maths support program for high school mathematics

Wenbo Li (UQ) (Senior Secondary) (Curriculum, Pedagogies)

This presentation presents maths support programs run at The University of Queensland in supporting Year 11 and Year 12 students in studying the senior maths subjects. The presenter will share the interesting results from the post-session surveys and discuss the options to support schools to localise the support program within schools. The presenter will also highlight the key factors that students finds helpful in a successful maths support program.

Wenbo currently works as an Associate Lecturer at the University of Queensland, teaching first-year mathematics. He has a dual degree in Education and Science, majoring in mathematics. Wenbo has taught in both secondary and tertiary settings and has a strong interest in mathematical education. He has a passion and commitment to support students and teachers in learning and teaching mathematics at the secondary/tertiary interface.

Enabling student numeracy progress using the Moving numeracy forward P–12 research paper

Monique Russell (Education Queensland) (P-10)(Curriculum)

Enabling student numeracy progress using the Moving numeracy forward P–12 research paper': Numeracy is a general capability in the Australian Curriculum and developing students' numeracy capability is recognised as critical to student academic success and life beyond school. Do we really have an understanding of what numeracy is? How we can progress our students' numeracy capability across all learning areas and subjects? In this session, the Queensland Department of Education's Moving numeracy forward P–12 paper's Core Messages will be unpacked to examine the research base that supports numeracy improvement for all students from Prep to Year 12.

Monique has worked in state schools primary education for 32 years, in varied roles including classroom teacher, Curriculum implementation, Physical education, Numeracy coaching, mathematics coaching and advisor roles.

Monique sees the teacher's role in constructing engaging and effective learning activities for mathematics as being critical to students' success and positive disposition for mathematics that can have far-reaching effects past the primary and secondary years. Monique is an executive member of the QAMT and enjoys sharing with and learning from teacher colleagues and encouraging others to continue on their learning journey in mathematics teaching.

Concurrent Workshops 2 (55min)

The future of maths education in Australia - how we ensure all students have access to quality education.

Narelle Morris (Teacher) (Senior Secondary) (Curriculum, Pedagogies)

The decline in the number of senior maths teachers and the number of out of field teachers means we need to be looking at how we can sustain the delivery of senior maths across Queensland and Australia. The QAMT is providing support through our Teachers Supporting Teachers program. I would like to explore other possibilities and would like to offer participants to share their thoughts and suggestions.

Narelle is a Mathematics teacher with 35 years experience. She has a passion for supporting teachers, especially in regional areas. She has been part of the QAMT executive for many years and facilitates the QAMT Senior Teachers Supporting Teachers program.

Using images to model equations, calculate the heights of mountains on the Moon and the distance to the ISS (International Space Station).

Stephen Broderick (Teacher, St Ursula's College, Toowoomba) (Secondary)(Curriculum)

A DSLR camera or mobile phone can be used to collect data as students trace out the paths of various curves which include straight lines, quadratics or ellipses. Using Photoshop, the height of a student is plotted to reveal information about the type of curve being modelled. Images of ISS transits can provide information about the height and distance to the ISS. The relationship between brightness, altitude and distance to the ISS will also be investigated. The heights of mountains on the Moon and the depth of craters will also be determined by measuring the lengths of shadows cast.

Stephen Broderick has been a teacher of mathematics and science at St Ursula's College Toowoomba for 37 years and was the mathematics coordinator for 22 of those years. His interests include astronomy, mathematical modelling, STEM and the use of technology to model real world problems. He hopes to see Halley's Comet again.

Learning mathematics with a scientific calculator.

Barry Kissane (Emeritus Associate Professor of Mathematics Education, Murdoch University) (6-10)(Pedagogies)

Although almost universally available, scientific calculators are widely misunderstood as essentially devices for dealing with numerical computation. In this virtual workshop, we will challenge this narrow view by exploring how upper primary and lower secondary students can learn some important mathematical ideas in number, algebra and measurement through the well-designed use of a calculator. To ensure that the workshop is a workshop, and not a lecture, participants should bring with them a real or virtual scientific calculator such as a CASIO fx-82 AU PLUS II or a similar educational calculator.

Concurrent Workshops 3 (1hr)

Senior Mathematics Examination writing – tips and ideas to help teachers prepare examinations

Evan Winters and Catherine Smith (QCAA) (Senior Secondary) (curriculum)

Writing Examinations is a skill and an activity that requires a great deal of time and effort to produce a genuine and fair assessment for students. An effective examination needs to address all the assessment objectives and representatively sample the subject matter at the appropriate level of difficulty. This presentation is aimed at helping teachers produce examinations in a timely and effective manner.

Evan Winter is the Learning Area Manager for Mathematics and is responsible for all aspects of Queensland's Senior Mathematics Syllabuses. He has taught secondary Mathematics at all levels from year 8 to year 12 with over 20 years of in-class experience. In recent years he has worked at the QCAA as the Senior Education Officer for Mathematics A, then the Principal Education Officer for Specialist Mathematics, General Mathematics and Mathematical Methods.

Catherine is a Principal Education Officer in Mathematics, supporting both Mathematical Methods and Specialist Mathematics. She has taught secondary Mathematics at all levels for over 20 years. Prior to commencing at the Queensland Curriculum and Assessment Authority, she was working as a pedagogical coach and supporting teachers from P - 12 to develop mathematical thinking in their students.

M in STEM

Paulina Sliedrecht and Linda Carroll (Education QLD) (Upper Primary and all Secondary) (Pedagogies)

Problem solving, inquiry and modelling skills as well as productive dispositions are vital to student success in P-10 mathematics and a successful transition to senior mathematics. In this session you will explore a suite of resources developed by respected maths educators such as Professor Marilyn Goos and Associate Professor Katie Makar, around six key topics in P-10 and Senior mathematics. To enhance your professional learning, each topic; productive disposition, problem solving inquiry, problem solving modelling, reasoning, new senior content and pedagogies to revise, review and rehearse, emphasises and models evidence-based pedagogies that you can use in your very next class. You will also witness how these pedagogies are being used in 'real' classrooms. We joined the STEM team to develop and lead a project called M-in-STEM. As we are both recently out of the classroom we bring to this project recency of practice with a clear understanding and focus on the realities of the classroom. The STEM team is part of the State Schools Performance division in Education Queensland. We are the team that delivers projects to support teachers in all areas of STEM.

Paulina is an experienced junior secondary mathematics teacher with leadership experience in large and small schools. Linda is a senior experienced senior mathematics teacher with over twenty years' experience in regional and metropolitan schools.

Free resources for delivering excellence in financial literacy.

Damian Nicholson (Financial Basics Foundation FBF) (P-10)(Pedagogies)

Financial Basics Foundation (FBF) provides free of charge to all Australian secondary educators extensive resources and services designed to support students to develop financial life skills. This workshop will focus on exploring FBF's mathematics focussed financial literacy WebQuests, developed to help teachers dealing with COVID-19 disruption, and ESSI Money, an interactive online game delivered in an innovative app-based environment. Students practice a wide range of real-life earning, saving, spending and investing and experience the financial consequences in a safe, fun and challenging way.

Damian is the National Program Manager at Financial Basics Foundation. He is an experienced Business and Technology teacher and Head of Department, who taught in regional and rural parts of Queensland for over 15 years. Damian is passionate about the importance of financial literacy as a life skill, and is constantly seeking new and innovative ways to meet the needs of students and teachers.

Panel – Addressing the Teacher Shortage

Panel Chair: Paulina Sliedrecht (QAMT President)

Panel members: Prof. Marilyn Goos (USC), Dr Lewes Peddell (SCU), Lin Esders (QTU), Suellen Lyle (QAMT Rockhampton)