This listing includes all sessions included in the conference program as at 10 September, 2019.

**Primary – Prep to Year 6**  
**Middle – Years 7 to 9**  
**Senior – Years 10 to 12**

Details of session times and rooms will be added closer to the conference.

### Opening Keynote

**Using Cognitive Activation Tasks to Catalyse Change In All Classrooms**  
*Rob Proffitt-White, Queensland Department of Education*

Clarity around the mathematical proficiencies, mathematical literacies, general capabilities, and cognitive verbs are an integral part of a teachers’ tool kit today.

For this to happen, teachers and school leaders need time for and access to workshops that allow them the time to design, try out and align new ideas; cognitive activation tasks

The keynote will address the problems of practice facing many schools despite the plethora of resources available. It will take you through the what, why and how behind the improved achievement and reported reengagement of students in mathematics classes across Prep to Year 9 and improved retention of mathematical literacies in other learning areas.

This will become the theoretical platform for the Rob’s workshops.

### Closing Keynote

**Positive Perceptions of Mathematics: Exploring the Personal Connections to Mathematics as a Catalyst for Engagement**  
*Desley Pidgeon, Central Queensland University*

This current research study explores the perceptions of Mathematics from those individuals who identify positively with all or any aspects of mathematics. In a world where it is acceptable to make the statement “I hate Maths”, it is time to reinvigorate the attitude to and perception of Mathematics.

The reasons why people are attracted to mathematics are many and varied. While creating profiles to represent the associated attributes of people who love mathematics is ambitious, the findings have the potential to provide insights for the development of educational environments that encourage an attraction to mathematics in people.

The key findings thus far have provided a unique view of what connects people positively to mathematics, which encourages and promotes both further study and careers in the discipline. The influences on both the extrinsic and intrinsic factors that support a positive reaction to mathematics provide the basis of further investigation. Informing educators about the influences may form a part of a toolkit to be a catalyst for a positive change to how and where mathematics can take someone.
<table>
<thead>
<tr>
<th>Session Title</th>
<th>Speaker</th>
<th>Institution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>This Is How I Do It (After 40+ Years of Teaching Maths) - Numeracy, Percentages, &amp; Measurement</td>
<td>Rex Boggs, Retired Teacher</td>
<td></td>
<td>Over the years I have tried a variety of approaches to teaching Maths. This is how I now teach Numeracy, Measurement, &amp; Geometry. I will give each participating school a link to a Dropbox folder that contains the resources used in this session.</td>
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<td>Teaching Maths - Making The Case for Direct Instruction (But With A Difference)</td>
<td>Rex Boggs, Retired Teacher</td>
<td></td>
<td>I have been semi-retired since 2016 and hence have recently had time to read about and reflect on the different approaches to teaching Maths. My reading includes books by David R Johnson (Every Minute Counts), Craig Barton (How I Wish I’d Taught Maths), Dylan Wiliam (Embedded Formative Assessment) and many others. In this presentation I will share what I have learned from my reading and reflection and what I wish I had known when I started teaching. I will be using an approach from Every Minute Counts – I will be presenting a summary or 200+ refereed papers and articles, and 12+ books, in 50 minutes! I will share my reading list and other resources with participating schools via a Dropbox link.</td>
</tr>
<tr>
<td>Designing An A4 Paper Rocket</td>
<td>Stephen Broderick, St Ursulas College</td>
<td></td>
<td>In July 2019, the Australian Space Agency opened for business in Adelaide. There will be many future positions available for engineers and mathematical modellers. In this problem-solving activity, participants will design and test a paper rocket made out of a sheet of A4 paper. The paper rockets will be launched and examples of data collected and analysis will be presented.</td>
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<tr>
<td>Two Astronomical STEM Activities</td>
<td>Stephen Broderick, St Ursula’s College</td>
<td></td>
<td>Can I accurately determine the tilt of the Earth’s axis and determine my location’s latitude with just a pinhole camera? Can I prove that the Earth’s orbit is elliptical, calculate its eccentricity and determine the dates of perihelion and aphelion? Both of these activities can be used in a primary context and can be extended and used as a PSMT in the senior school. One lucky participant will win a pinhole camera.</td>
</tr>
</tbody>
</table>
Designing Great Inquiry Tasks & Assignments In 10 Minutes Flat  
*Tierney Kennedy, Back-to-Front Maths*
In this session you will learn how to design great tasks that suit your own students in ten minutes flat. Be prepared to think hard and write so that you can take home multiple inquiry tasks that you have designed as well as many ideas to build on.

"But I just Knew It!" Helping High Achieving Students To Improve Their Reasoning  
*Tierney Kennedy, Back-to-Front Maths*
Have you ever asked a student how they got their answer and heard back, “I just knew it”? This workshop will give you multiple ideas on how to get students to figure out what they did, show it in a way that is clear and prove their ideas. It includes looking at high-end reasoning strategies such as deductive reasoning, making conjectures, testing them out and proving and disproving hypotheses.

Intervention Strategies That Actually Work To Catch Kids Up  
*Tierney Kennedy, Back-to-Front Maths*
Some strategies that we implement in schools actually have a negative effect on students. This workshop will introduce you to six well-researched strategies that add between 5 and 18 months gain on standardised testing, help you think through common issues such as the best use for teacher aides, and present practical ideas that you can pick up and use without a lot of effort.

Serious Extension For Gifted Students  
*Tierney Kennedy, Back-to-Front Maths*
When students are working multiple years ahead of the class it can be difficult to know what to do. We want to extend them, but not necessarily by increasing the content level in questions. This workshop will include: what kind of questions and problem to set, how to adjust your existing resources to make the questions more complex, and also how to create resilience and persistence in students who are used to being right all the time.

Maths Teams Challenge  
*Queensland Association of Mathematics Teachers*
Get the chance to participate in a mini Maths Teams Challenge, a popular event held across the state by various QAMT branches. Members from Rockhampton and Toowoomba regions who have convened successful events for many years will be there to discuss the philosophy, breakdown the skills and structure, and lead a demonstration MTC for you to have a go. Further information about how to get your school and students involved will also be available.
## Teaching Maths Digitally Using OneNote Classroom
*Rebecca Richards, Capricornia School of Distance Education*

In this workshop participants will work with a cloud-based platform of Class Notebook to engage students and increase capturing evidence of learning and work returns. Participants in this workshop will be given access to a Class Notebook so they can connect with the presenter in a real-life scenario.

| All |

## The Best & The Rest From The West
*John West, Mathematical Association of Western Australia*

This hands-on workshop will demonstrate some games that I have found useful in the classroom and which appear in some of MAWA’s latest publications for parents, graduate and early-career teachers. QAMT members are eligible for member discounts on MAWA products and competitions which I am happy to discuss.

| All |

## Essential Early Number Concepts
*Leah O’Neill, Back-to-Front Maths*

This workshop will focus on the building blocks for early number understanding, how to identify common misconceptions and ensure that students have a deep understanding. Participants will be provided with examples of diagnostic tasks and a tracking sheet for record keeping.

| Primary |

## Teaching Maths Concepts Through Intentional Play
*Leah O’Neill, Back-to-Front Maths*

Play engages young students and provides powerful learning opportunities, but how can we teach mathematical concepts through play? We will use a simple planning format to design a sequence of maths lessons beginning with free play and progressing to challenging problems and opportunities to transfer and adapt what they have learnt.

| Primary |

## Building Persistence & Resilience
*Leah O’Neill, Back-to-Front Maths*

We all want our students to engage in problem-solving experiences but what do we do when they actively avoid them, just won’t get started or give up too easily? During this workshop we will explore ideas for challenging students and practical methods for encouraging persistence and resilience.

| Primary |

## One Game Board, Many Games
*Leah O’Neill, Back-to-Front Maths*

Games are great for motivating students but who has time to make enough of them? In this workshop we will explore uses for games and invent many flexible ways to use a single game board.

<p>| Primary |</p>
<table>
<thead>
<tr>
<th>Session Details</th>
<th>Emmaus College, Rockhampton</th>
<th>3-4 October, 2019</th>
</tr>
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</table>
| **Using Cognitive Activation Tasks To Catalyse Change In All Classrooms**  
Rob Proffitt-White, Queensland Department of Education  
Rob will go through how the different tasks and formative assessment tools were needed and made. These are the tasks that schools have said have made the most difference when used alongside regular lesson plans and textbooks. The words and actions to activate general capabilities and allow all students to access and investigate the tasks will be explored through this workshop.  
**Primary** | |
| **Primary & Secondary Mathematics : A True Continuum**  
Sue Stevens, St Mary’s College  
A strong sense of numeracy and confidence in recognising patterns is a necessary foundation for the development of abstract mathematical thinking. This presentation will outline the essential learnings for the transition from primary to secondary schooling.  
**Primary** | |
| **Fractions & Decimals**  
Anna Bock, Australian Mathematical Sciences Institute  
Fractions and decimals are often viewed as complex concepts for students to learn and for teachers to teach. Using a range of manipulatives, rich open tasks and asking the right questions educators can support students in their struggle to conceptually understand these content areas and impact on their learning. This session will explore research into the teaching and learning of fractions and decimals and how we can identify student misconceptions and address them.  
**Primary & Middle** | |
| **Year 5/6 & Year 7/8 Quiz**  
Queensland Association of Mathematics Teachers  
Get the chance to participate in a mini quiz, an annual QAMT event across the state. Peter Cooper, convener and question writer, will be there to discuss the philosophy, breakdown the skills and structure, and lead a demonstration for you to have a go. Further information about how to get your school and students involved will also be available.  
**Primary & Middle** | |
| **Coding Without Computers**  
Desley Pidgeon, Central Queensland University  
Engaging community into the classroom. This will be a hands-on session on the relevance of coding in everyday life.  
**Primary & Middle** | |
### Using Cognitive Activation Tasks To Catalyse Change In All Classrooms

*Rob Proffitt-White, Queensland Department of Education*

Rob will go through how the different tasks and formative assessment tools were needed and made. These are the tasks that schools have said have made the most difference when used alongside regular lesson plans and textbooks. The words and actions to activate general capabilities and allow all students to access and investigate the tasks will be explored through this workshop.

**Middle**

### Using Computers In A Maths Classroom With Year 7 - 10 Students

*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, and 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).

**Middle**

### Building Mathematical Mindsets

*Sara Mathews, Brisbane Bayside State College*

Many students believe they are ‘not a maths person’ and have a closed mindset to learning maths. Through the use of mindset messages and visualisation tasks students can change their mindset about maths. Strategies used to build mathematical mindsets in a state high school will be presented.

**Middle**

### Modelling Motion

*Peter Fox, Texas Instruments*

Linear, quadratic and trigonometric functions are just the start. There are so many areas of mathematics that become so much richer when students model motion. Somersaults, bouncing balls, pendulums, and hot air balloons; the sky is the limit.

**Middle & Senior**

### Parabolas - Shifting The Focus

*Peter Fox, Texas Instruments*

There is so much more to this wonderful curve than factorising and expanding the algebraic representation. Paper folding, applications and modelling are just some of the elements that will be touched on in this workshop.

**Middle & Senior**
### Black Star Maths
*David Ilsley, Black Star Maths*

The presentation will be a guided tour through and discussion of the Black Star Maths website, [www.blackstarmaths.com](http://www.blackstarmaths.com). This website contains a set of maths learning materials covering all topics commonly encountered in Years 7 to 12 Maths. It is designed to help students learn more independently, but has other potential uses, including as an alternative to a textbook.

**Middle & Senior**

### Maths In A Box
*Jim Lowe, Queensland University of Technology*

This hands-on workshop uses origami techniques to create paper boxes of varying sizes. Measurements collected from these boxes provide data for modelling activities which can be completed with or without technology. Participants will also develop a theoretical model for comparison with that obtained from the data collected.

**Middle & Senior**

### Technology Use In The 2020 General & Essential Exams - Getting The Best From Your Scientific Calculator
*Alastair Lupton, Le Fevre High School*

Based on the new QCAA General and Essential mathematics courses, this workshop will look at the main ways that scientific calculators – in particular the Casio fx-82/100AU Plus - can be used in external examinations. We will look in detail at univariate and bivariate data analysis – calculating summary statistics, regression models and Person’s R – by accessing some recently released “How to” video resources, as well as touching on measurement and other matters. Bring your Casio scientific calculator or borrow one of ours for the session.

**Middle & Senior**

### Engagement Through Problem-Solving & Higher-Order Cognitive Thinking
*Steve McCabe, Mighty Minds*

This workshop aims to equip teachers with the skills that they need to develop higher cognition questions and teach problem-solving, the ultimate purpose being to improve the scope and depth of student responses. We will use examples to explore the characteristics of a good maths question.

**Middle & Senior**

### Teaching The Idea Of Infinity To Students
*John Steinbach, Alexandra Hills State High School*

The idea of infinity in mathematics has a complex history. It can be baffling. Ideas will be presented which aim to clarify and simplify understanding appropriate to middle and secondary students.

**Middle & Senior**
<table>
<thead>
<tr>
<th>Session Details</th>
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</thead>
</table>
| **The Casio fx-CG50AU : The Prequel**  
*Elena Zema, Casio Education*  
Learn the basic introductory skills to operate the Casio fx-CG50AU. Free and useful resources will be available, that will convert you from beginner into a fluent CG50er in no time! This workshop is for first time users or if you just need to freshen up those skills.  
MIDDLE & SENIOR |
| **Problem-Solving & Modelling Tasks In The New Mathematics Syllabus**  
*Stephen Broderick, St Ursula’s College*  
PSMT tasks contribute significantly to the overall assessment in the new senior mathematics courses. Examples of PSMT tasks and where to find data and information will be presented during this session.  
SENIOR |
| **Statistics In General Mathematics & Mathematical Methods**  
*Michael Bulmer, University of Queensland*  
General Mathematics and Mathematical Methods include new topics on bivariate data analysis, probability, and statistical inference. We’ll discuss the background of some of these topics and approaches to teaching and assessing them.  
SENIOR |
| **Technology Use In The 2020 Methods Exam - Just What Do I Need To Know?**  
*Alastair Lupton, Le Fevre High School*  
Based on the recent release of the QCAA Math Methods mock exam, this workshop will attempt to answer the question “just what technology use is expected of students in this form of assessment?”. This core functionality will be workshopped and a set of video solutions for the mock exam, showcasing the use of a Casio CG50 alongside ‘by hand’ solutions, will be shared and discussed. Bring your choice of handheld technology or borrow a CG50.  
SENIOR |
| **What’s New In Senior Mathematics — ‘Statistically Speaking’?**  
*Warren Richards, QCAA*  
The domains of Data in Essential Mathematics and Statistics in General Mathematics, Mathematical Methods and Specialist Mathematics provide opportunities for students to engage with a greater range of subject matter related to statistics.  
In this seminar, participants will:  
- identify the links between the F-10 Australian Curriculum and the subject matter of Essential Mathematics, General Mathematics, Mathematical Methods and Specialist Mathematics  
- explore the connections between sample proportions and sample means using the subject matter in Mathematical Methods and Specialist Mathematics in the field of statistical inference.  
Information at this presentation will support the second QCAA presentation related to IA3 assessment development.  
SENIOR |
Creating IA3 Questions Based On The New Subject Matter In Unit 4 Of Mathematical Methods & Specialist Mathematics

*Warren Richards, QCAA*

In this seminar, participants will:

- consider the following subject matter in Mathematical Methods and Specialist Mathematics that may be unfamiliar to them
  - concavity and points of inflection (MM)
  - interval estimates for proportions (MM)
  - probability density function (MM and SM)
  - volume of solids of revolution (SM)
  - slope (direction or gradient) fields (SM)
  - statistical inference using sample means (SM)

- enhance their confidence in the development of questions based on this subject matter.

Participants are encouraged to bring their laptop to this presentation.

Senior

Research Informed Strategies To Support Student Learning In Mathematics

*Warren Richards, QCAA*

A review of the literature associated with the enactment of mathematics syllabuses of top-performing nations reveals distinct attributes. These attributes provide insights that underpin the design of the new senior syllabuses and should be considered in any high-quality mathematics teaching, learning and assessment. These attributes relate to mathematics as a hierarchical body of disciplined knowledge, linking basic skills and knowledge with problem-solving and reasoning, mastery learning, using technology purposefully, developing 21st century skills, and developing and promoting creativity in the teaching and learning contexts of mathematical problem-solving. This session will explore contemporary research on successful teaching and learning in mathematics, including building on existing knowledge, making connections between concepts and representations, structuring lessons and mathematics tasks, teaching strategies for solving problems and to check for understanding, the role of metacognition and the self-system, and understanding the role of cognitive processes in learning.

Senior

Using Computers In A Maths Classroom With Year 11/12+ Students

*Robert Rook, Mathplot*

This session will run through using technology (Mathplot) in the classroom for Years 11-12+. Among the topics covered are graphing, calculus, consumer maths, complex numbers, distributions, probability, and vectors, to name a few. Generation of various 2D and 3D equations include above topics plus 3D planes, surfaces, tori, knots, and 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.

Senior
## Unpacking Exam Questions In Senior Maths
*Stephen Swift & Robert Yen, Cengage Australia*

Have you started teaching and testing the senior maths courses? This workshop will analyse exam-style questions for the Maths Methods and General Maths courses, including complex familiar and unfamiliar questions. We will examine their solutions and marks allocations, and showcase the published Year 12 editions of the Nelson QMaths series.

### Senior

## Preparing For General Exams In 2020
*Charlie Watson, Queensland Exam Papers*

This workshop will explore a range of questions sampled from Year 12 General external exams set by various state authorities over the past three years. Emphasis will be on the less familiar topics in the new course, with the aim of clarifying some of the dot points and gauging the level of rigour required.

### Senior

## Preparing For Methods Exams In 2020
*Charlie Watson, Queensland Exam Papers*

This workshop will explore a range of questions sampled from Year 12 Methods external exams set by various state authorities over the past three years. Emphasis will be on the less familiar topics in the new course, with the aim of clarifying some of the dot points and gauging the level of rigour required.

### Senior