STEM for an *unwritten future*

STEM CONFERENCE

Friday 27 November 2026

Marden Senior College

PROGRAM

HOSTED BY:

DATTA South Australia
Design And Technology Teachers Association

EdTechSA Inc.

The Mathematical Association of South Australia

SASTA South Australian Science Teachers Association

PROGRAM OUTLINE

8.00am	Registration | Tea & Coffee	
8.40am - 9.00am	Welcome & Housekeeping	The Hall
9.00am - 10.00am	Keynote Presentation	The Hall
10.05am - 10.35am	Morning Tea	
10.40am - 11.40am	Workshop Session 1	Various
11.50am - 12.50pm	Workshop Session 2	Various
12.50pm - 1.45pm	Lunch	
1.50pm - 2.50pm	Workshop Session 3	Various
3.00pm - 4.00pm	Workshop Session 4	Various
4.00pm - 5.00pm	Happy Hour	

REGISTRATION PRICES

Registration Type	Fee
DATTA, EdTechSA, MASA, SASTA Members	$160
Non Member	$250
Student Member	$55
Student Non-Member	$95
Presenters	$75

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KEYNOTE PRESENTATION

Dr Hayden Tronnolone

Dr Hayden Tronnolone is a Lecturer in Mathematical Sciences at Flinders University, with a passion for making mathematics more accessible and engaging for students and educators. He has developed innovative teaching approaches, alternative pathways into university mathematics and professional learning opportunities for teachers, particularly those teaching mathematics outside their area of specialisation.

His work has helped increase participation in mathematics education and support teachers in regional and rural communities. In recognition of his contributions, Hayden was named the 2025 South Australian STEMM Educator of the Year (University or RTO).

Reclaiming STEM For Unwritten Futures

Generative artificial intelligence (AI) is developing rapidly, with new models appearing overnight and unleashing new capabilities. This is creating near-continuous change in the way we all approach STEM, from students exploring their first experiments through to experts at the cutting edge of science. How do we write a future for STEM when we cannot predict the next day? What is our place in STEM, and the future place for our students? In this presentation, we will explore how AI is influencing STEM today, and how it has already changed our approaches. From this, we will examine our role in STEM as people and as educators to identify the constants hidden within this change. This will highlight some of the efforts already underway and report on some early research into assessment approaches. Drawing upon these discussions, I will propose a STEM future where we can learn, teach and assess alongside AI without compromising our values and, importantly, without losing the curiosity, joy and wonder we find in STEM.

WORKSHOP OUTLINE

SESSION 1
10.40am - 11.40am

		Primary (R-6)	Junior Secondary (7-10)	Senior Secondary (10-12)	**Target Audience**	Design & Technologies	Digital Technologies	Mathematics	Science
1.01	From Classroom Waste to Live Data: A Year 5-6 STEM Investigation	●				●	●	●	●
1.02	Deadly Science: Fish Traps	●	●			●		●	●
1.03	Design Thinking In Action - An interactive professional learning experience	●	●			●	●	●	●
1.04	Creating Inclusive Maths Classrooms: Evidence-Based Strategies for Equity and Belonging	●	●				●	●	●
1.05	Supporting Digital Technology Integration: From Policy to Classroom Practice		●					●	●
1.06	Is Australia Shaking? Exploring Earthquakes Through Live Data		●	●					●
1.07	Beyond the Submission: Authentic Assessment in an AI-Enabled World		●					●	●
1.08	Engaging All Learners in STEM through Universal Design for Learning		●	●				●	●
1.09	Give Students a Real Problem: Bringing Industry Challenges into the Classroom	●	●	●		●	●		
1.10	Demonstration-Observation-Reflective Conversation - a team-teaching informed coaching model for teacher growth	●	●	●		●	●	●	●
1.11	Kissing Parabolas		●	●				●	

SESSION 2
11.50am - 12.50pm

		Primary (R-6)	Junior Secondary (7-10)	Senior Secondary (10-12)	**Target Audience**	Design & Technologies	Digital Technologies	Mathematics	Science
2.01	Videogames - more than just entertainment	●				●	●		●
2.02	Paper Pulp (Recycling) Party	●	●			●			●
2.03	Educating Australia's Renewable Energy Future with STELR	●	●			●			●
2.04	You Can't Be Who You Can't See: Building Scientific Literacy Through Authentic Connections	●	●						●
2.05	Introduction to database structures		●	●			●		
2.06	Scimex: Using real-world news as a STEM resource		●	●					●
2.07	Curriculum in a Kayak		●	●					●
2.08	Operation Critical - Future Resource Management of Critical Minerals			●					●
2.09	New technology - same old maths exam(s) - results in 2026			●				●	
2.10	Creating bespoke educational tools through AI assisted Vibe coding			●		●	●	●	●
2.11	Making Purposeful Decisions About Digital Technology Integration		●					●	●

SESSION 3
1.50pm - 2.50pm

		Primary (R-6)	Junior Secondary (7-10)	Senior Secondary (10-12)	**Target Audience**	Design & Technologies	Digital Technologies	Mathematics	Science
3.01	Science in their Hands	●	●						●
3.02	Hands-On Astronomy in the Primary Classroom	●	●			●			●
3.03	Is our future plastic? Learning experiences that foster critical thinking about materials and sustainable futures	●	●			●			●
3.04	Future Cities: Designing the Unwritten Future with AI and Architecture		●			●			●
3.05	Structures and Materials: Building bridges in the classroom, who can design the best bridge?			●		●			●
3.06	Using Electronegativity to Make Sense of Bonding		●	●					●
3.07	Ripples in Spacetime: Bringing Einsteinian Physics and Gravitational Waves to the Classroom		●						●
3.08	Beyond the Tuning Fork: My Free Browser-Based Wave Analysis Tools for Physics		●	●					●
3.09	Beyond the Paper Plane: Teaching Teams to Think, Test and Adapt		●	●		●	●	●	●
3.10	Empowering Students with Learning Needs in Stem Education	●	●	●				●	●
3.11	Teacher voice in action: Small questions, shared insights	●	●	●		●	●	●	●

SESSION 4
3.00pm - 4.00pm

		Primary (R-6)	Junior Secondary (7-10)	Senior Secondary (10-12)	**Target Audience**	Design & Technologies	Digital Technologies	Mathematics	Science
4.01	Invention Engines STEM Project Based Learning	●	●			●	●	●	●
4.02	Teaching Integrated STEAM Learning in Natural Spaces	●	●			●	●	●	●
4.03	How can we bring the ISS down to Earth?	●	●	●			●		●
4.04	Making Maths Matter: Connecting Classroom Learning to Real Life	●	●					●	
4.05	Take learning to the sky	●	●			●		●	●
4.06	Starting in STEM: Designing Impactful STEM Projects	●	●			●	●	●	●
4.07	Could data save Humpty? An new approach to impulse experiments with datalogging that work	●	●	●		●			●
4.08	Mission Ready: Commission Your Own Classroom Satellite		●	●		●	●	●	●
4.09	Classroom Astronomy in the Era of Big Data		●	●			●		●
4.10	Beyond Prompting: Advanced Reusable AI Workflows with Codex and Agentic AI		●	●			●	●	●
4.11	Can a Minecraft World Change the Real One?	●	●				●		●

WORKSHOP DESCRIPTIONS

SESSION 1 | 10.40am - 11.40am

1.1 From Classroom Waste to Live Data: A Year 5-6 STEM Investigation

Usman Bhatty, WeCoExist

How can a familiar classroom waste problem become a meaningful STEM investigation?

In this hands-on workshop, participants will work in three table groups, each with a classroom sensor device. Groups will take a sensor reading and see the current bin fill level appear immediately on the WeCoExist dashboard. They will then use data collected beforehand to interpret graphs, identify patterns and explore class and school comparisons that are updated hourly.

Teachers will experience selected activities from a Year 5-6 learning sequence combining measurement, data representation, percentages, prediction, scientific inquiry and sustainability. They will also consider measurement error, data quality and how students can plan a fair comparison to test whether a waste-reduction action changes measured bin fill.

WeCoExist, developed in South Australia, will be used as a worked example. The focus will be on curriculum-aligned teaching, assessable student evidence and practical classroom implementation.

Participants will leave with three adaptable investigations, student worksheets, curriculum links and strategies they can apply in their own STEM teaching.

Target Audience: Design & Technologies (Years R-6); Digital Technologies (Years R-6); Mathematics (Years R-6); Science (Years R-6)

1.2 Deadly Science: Fish Traps

Phola Ramos, South Australian Museum

Discover the engineering ingenuity of Aboriginal and Torres Strait Islander Peoples through the design and function of traditional fish traps. This interactive workshop explores how these sophisticated technologies supported sustainable harvesting by responding to seasonal cycles, water flow, river flooding, and species conservation. Participants will model their own fish traps and tests based on the varying conditions. This session demonstrates how Indigenous knowledges and scientific thinking can be integrated to inspire curiosity, sustainability-focused problem-solving, and deeper understanding of Australia's living STEM innovations.

Target Audience: Design & Technologies (Years R-10); Mathematics (Years R-10); Science (Years R-10)

1.3 Design Thinking In Action - An interactive professional learning experience

Guy Harrison, Makers Empire

In a world where information is increasingly abundant and artificial intelligence can generate answers in seconds, the ability to identify meaningful problems, think creatively, collaborate effectively and develop innovative solutions has never been more important. Design Thinking provides educators with a practical, evidence-informed framework for developing these capabilities while delivering engaging, curriculum-aligned STEM learning.

This interactive workshop explores how Design Thinking can be embedded into everyday classroom practice to create authentic, student-centred learning experiences. Participants will experience each stage of the Design Thinking process through hands-on activities and discover practical strategies for fostering empathy, inquiry, creativity, rapid prototyping and iterative improvement across a range of STEM contexts.

Drawing on successful Makers Empire industry partnerships in advanced manufacturing, construction, environmental sustainability and emerging technologies, the session showcases classroom-ready projects that connect students with real-world challenges and authentic audiences. Teachers will also explore how 3D design and 3D printing can be used as powerful tools for thinking, testing and communicating ideas rather than simply creating models.

Participants will leave with practical teaching strategies, adaptable project ideas and a collection of ready-to-use resources that can be implemented immediately across Years 3-10. Whether you are new to Design Thinking or looking to deepen its impact in your classroom, this workshop will provide practical approaches to developing creative, resilient and future-ready learners.

Suitable for: Primary and Secondary teachers (Years 3-10)

Focus Areas: STEM, Design Thinking, Technologies, Engineering, Project-Based Learning, Innovation, AI-ready Skills

Target Audience: Design & Technologies (Years R-10); Digital Technologies (Years R-10); Mathematics (Years R-10); Science (Years R-10)

1.4 Creating Inclusive Maths Classrooms: Evidence-Based Strategies for Equity and Belonging

Rebecca Vivian, Adelaide Univeristy

Every student deserves to see themselves as a maths person and to feel that they belong in the maths classroom. Yet for many learners, barriers to participation and belonging in mathematics persist. This session explores what the research tells us about inclusive STEM learning environments, and how teachers and school leaders can take meaningful steps toward building more equitable spaces for learning.

We begin with an overview of the 8 Principles for Inclusive STEM Education from the Get into STEM: Diversity in STEM toolkit, offered as a framework for reflecting on our classrooms, schools, and practice. From there, we showcase strategies and resources that support teachers and school teams to create inclusive and responsive maths classrooms for all students.

Whether you are just beginning to think about inclusion in your maths program or looking to build on what you are already doing, this session will leave you with new evidence-based strategies and practical resources to take back to your schools.

Who Should Attend: Classroom teachers, curriculum coordinators, and school leaders with an interest in equity, inclusion, and improving outcomes for all STEM learners.

Disclaimer: While this session is framed around mathematics, the principles and strategies presented are transferable to all STEM disciplines.

Target Audience: Digital Technologies (Years R-10); Mathematics (Years R-10); Science (Years R-10)

1.5 Supporting Digital Technology Integration: From Policy to Classroom Practice

Jennifer Chalmers, Adelaide University

Digital technologies are becoming increasingly embedded within Mathematics and Science education, yet many teachers continue to ask what effective digital technology integration looks like and what support they need to achieve it. Drawing on research examining the Australian Curriculum, education sector approaches, and current evidence on teacher support, this interactive workshop explores how curriculum intentions are interpreted and translated into classroom practice.

Through collaborative activities and discussion, participants will examine different approaches to supporting digital technology integration, compare these with current research, and reflect on the implications for their own schools and classrooms. Together, we will consider what kinds of support best build teacher capability and confidence to integrate digital technologies in purposeful and meaningful ways.

Participants will leave with evidence-informed insights, practical strategies for supporting digital technology integration, and opportunities to connect research findings with their own professional contexts.

Target Audience: Mathematics (Years 7-10); Science (Years 7-10)

1.6 Is Australia Shaking? Exploring Earthquakes Through Live Data

Dr Sima Mousavi, Australian National University

Please bring your laptop so you can participate in the live demonstrations and hands-on activities.

Think earthquakes don't happen in Australia? Think again! The Newcastle earthquake in 1989 and the Woods Point earthquake in Victoria in 2021 are powerful reminders that seismic activity can catch us by surprise. So, what's shaking down under?

In this engaging, hands-on workshop, you'll learn how to bring the science of earthquakes into your classroom and inspire your students using real-world data. Earthquake science connects geology, physics, engineering and human behaviour, making it a great fit for a range of STEM subjects.

We'll explore how seismic waves travel through the Earth, how they are recorded and why earthquakes can cause so much destruction. You'll also discover free online tools, interactive apps and up-to-date resources on earthquakes, tectonics and seismic hazards.

Expect live demonstrations that you can follow on your own device. You'll leave with practical teaching strategies and ready-to-use resources to enrich your lessons.

Target Audience: Science (Years 7-12)

1.7 Beyond the Submission: Authentic Assessment in an AI-Enabled World

Jakob Roth, Mercedes College

As AI becomes increasingly embedded in education, educators face growing challenges in ensuring that assessment evidence genuinely reflects student understanding. This workshop explores the use of practical and viva-based assessments as tools for verifying learning, promoting academic integrity, and capturing deeper evidence of student thinking. Drawing on recent case studies from Years 7-10 Science and Mathematics, participants will examine assessment design, implementation strategies, lessons learned, and future refinements that support authentic learning in an evolving educational landscape.

Target Audience: Mathematics (Years 7-10); Science (Years 7-10)

1.8 Engaging All Learners in STEM through Universal Design for Learning

Stefania Pulford, Shadae James and Amelia Broadbent, Thebarton Senior College

Engagement in STEM often declines across the middle years, particularly for students experiencing additional barriers to learning. According to the OECD PISA 2022 results, around one in four Australian 15 year olds are performing below baseline proficiency in mathematics, and around one in five are below baseline in science. These patterns highlight the need for more flexible and accessible approaches to STEM teaching. This workshop explores how Universal Design for Learning (UDL) can be used to improve access, participation, and success for all learners in STEM classrooms. With a focus on students who experience language, processing, sensory, or wellbeing barriers, the session will unpack practical ways to provide multiple means of engagement, representation, and expression, while still maintaining the rigour of STEM learning. Teachers will leave with concrete strategies, scaffolds, and ideas to make STEM more inclusive, engaging, and achievable for the diverse range of learners in their classrooms.

Target Audience: Mathematics (Years 7-12); Science (Years 7-12)

1.9 Give Students a Real Problem: Bringing Industry Challenges into the Classroom

Teresa G Janowski, STEM Fast Track

What happens when students receive a real job order from a real client?

In this hands-on workshop, educators will experience Project X, a design process Teresa Janowski has used with Years 3-6 at Walkerville Primary School, Years 4-5 at Tailem Bend Primary School, and high school students across a range of schools. Past projects have included laser-cut petals made from satin and lace, engraved acacia boards, trophies for a cyber conference, name badges for Stone & Chalk and Christmas cards for a Not For Profit.

Participants will work through a Job Order Sheet, research a client, identify the brief's requirements and develop a design for consideration. As in a real commission, a design must be approved before it can move to production. Participants may even have the chance to put their own work forward for approval!

The session will show how an authentic client brief can connect design and technology with research, communication, problem-solving and creative thinking. Educators will leave with a process they can adapt for their own students and local community.

Target Audience: Design & Technologies (Years R-12); Digital Technologies (Years R-12)

1.10 Demonstration-Observation-Reflective Conversation - a team-teaching informed coaching model for teacher growth

Alastair Lupton, Adelaide Botanic High School

Growing out of the challenges and opportunities of a high school built around team-teaching, and forged through use at 40+ diverse secondary sites as part of a 2.5 year project to champion non-routine problem-solving in middle school classrooms, a simple model, and some key principles, for coaching led teacher growth have emerged. What will be shared in this workshop, the model, thinking behind it, the data and what is next, may be more blindingly obvious than revolutionary, and will hopefully make for an interesting take on how teachers grow and adopt new practices, and the conditions that help or hinder that happening.

Target Audience: Anyone who is responsible for, or interested in, teacher professional growth

1.11 Kissing Parabolas

Anthony Harradine Prince Alfred College

In this workshop you will experience an uplifting activity in which students have the opportunity to apply various aspects of knowledge learned during a unit on quadratics. Beginning simply with observing the features of two graphs, it quickly turns into a treasure hunt based on student observations, and finishes with a truly delicious algebra fest.

Target Audience: Mathematics (Years 7-12)

SESSION 2 | 11.50am - 12.50pm

2.1 Videogames - more than just entertainment

Hilary Schubert-Jones, Future You - UNSW

Video games are more than just entertainment - they're powerful tools for learning and student engagement. When learning feels relevant, students become more engaged and confident - and that confidence shapes their early attitudes towards STEM learning. This session will introduce Future You's STEM Worlds offering, developed in partnership with Arludo, an Australian company creating educational videogames. Participants will explore how they can effectively use real-world STEM role models in free gamified learning modules to spark curiosity, build confidence and connect classroom learning to the real world. Teachers will leave with a clear understanding of how gamified classroom modules can challenge stereotypes about who belongs in STEM while grounding learning in real-world, socially relevant contexts.

Target Audience: Design & Technologies (Years R-6); Digital Technologies (Years R-6); Science (Years R-6)

2.2 Paper Pulp (Recycling) Party

Jo Hendrikx and Amy Lloyd, Keep South Australia Beautiful

Get your hands in some pulp with educators from KESAB to become a micro paper recycling factory! A hands-on way to explore learnings through the materials we find in our bins. As our economy works to become circular, what does this mean for us and our students as citizens and consumers? How can we incorporate themes of the value of materials into the curriculum in ways that support students to make sense, make an impact and get involved. And this is one way to get crafty and entrepreneurial too!

Target Audience: Design & Technologies (Years R-10); Science (Years R-10)

2.3 Educating Australia's Renewable Energy Future with STELR

Damian Woods, Academy of Technological Sciences and Engineering

In this workshop, learn how to boost STEM learning in schools with STELR, a program from the Academy of Technological Sciences and Engineering (ATSE) providing educational equipment and resources. Explore STELR's new curriculum resources that facilitate the delivery of the Australian Curriculum V9 in years 7-10. The STELR program is a hands-on inquiry approach to STEM education which for the last 15 years has supported over 1000 schools across Australia to deliver high-quality STEM education.

Target Audience: Design & Technologies (Years R-10); Science (Years R-10)

2.4 You Can't Be Who You Can't See: Building Scientific Literacy Through Authentic Connections

Dr Anna Antipov, STEMpals & Adelaide University

Scientific literacy is more than understanding concepts; it is helping students see science as something they can participate in, communicate about and contribute to. This workshop explores how authentic connections with Australian STEM professionals can strengthen STEM literacy, challenge stereotypes and build STEM identity.

Target Audience: Science (Years R-10)

2.5 Introduction to database structures

Ben Hock, Pembroke School

The world is built upon data and databases. This session will introduce easy to learn data concepts using Excel to structure and link data together simulating real-world software applications. The session includes a demonstration of SQL (using SQLite) with a hands-on 'CRUD' (create/read/update/delete) activity. Targeted at years 9 and above.

Target Audience: Digital Technologies (Years 9-12)

2.6 Scimex: Using real-world news as a STEM resource

Olivia Henry, Australian Science Media Centre (AusSMC)

Scimex.org is a news portal for journalists which aims to provide the best science resources to help reduce misinformation in the mainstream media. But these resources are available to the public too!

Join Olivia Henry from the Australian Science Media Centre (AusSMC) to learn how to use Scimex, and give you some ideas on how you might be able to use Scimex.org as a resource in your teaching.

Target Audience: Science (Years 7-12)

2.7 Curriculum in a Kayak

Patrick Fitzgerald, DSKT Education

Come and learn about how a guide from Dolphin Sanctuary Kayak Tours is teaching curriculum in a pioneering and innovative way - through kayaking! These educational programs have been mapped to science (and other subjects), curriculum, utilizing a combination of teaching and learning activities in an onsite classroom, with kayaking sessions in the Adelaide Dolphin Sanctuary, that directly relate to the subject matter. The outcome? Fun, interactive, hands-on, real-world learning that produces evidence of learning directly related to curriculum outcomes.

Target Audience: Science (Years 7-12)

2.8 Operation Critical - Future Resource Management of Critical Minerals

Phola Ramos, South Australian Museum

Step into the role of a mining company and experience the challenges of resource management through a simulation. Starting with limited information about a mineral specimen, participants make strategic decisions before uncovering new data on profitability, environmental impacts, ethical dilemmas, and operational costs. As conditions evolve, participants must decide whether to keep, trade, or sell their assets. This workshop demonstrates how real-world STEM challenges can foster critical thinking, collaboration, negotiation, and evidence-based decision-making. Aligned with Real World STEM Connections and Building Future Ready Learners, the activity equips educators with engaging strategies to explore sustainability, Earth Sciences, and the complex decisions shaping our future.

Target Audience: Science (Years 11-12)

2.9 New technology - same old maths exam(s) - results in 2026

Alastair Lupton, Adelaide Botanic High School

For the first time, students have just tackled the SACE Maths Methods and General Maths final examinations with a Casio fx-1AU Graph. How did they go? What have we learned? Approaches to these exams, tech and otherwise, will be shared and directions in SACE assessment will be discussed.

Target Audience: Mathematics (Years 11-12)

2.10 Creating bespoke educational tools through AI assisted Vibe coding

Maurizio Costabile, Adelaide University

Students regularly ask for ways to practice, test their understanding, and revise key concepts outside of standard class time. The rise of accessible generative artificial intelligence (AI) now allows school teachers to design tailor-made, interactive learning tools without touching a line of code. This workshop introduces “vibe coding”, an approach where subject-area teachers use simple, natural-language prompts with AI to translate pedagogical ideas directly into functional classroom web apps that solve specific learning gaps, or teaching challenges.

We share how three academics with zero programming background rapidly developed a range of interactive learning tools for their classrooms. These included virtual science laboratories, trade- and work-readiness simulators, interactive visualisations, and self-paced revision modules. Created in minutes to hours, these apps bypassed the need for school IT development, accelerated real-time feedback during units, and eliminated expensive software licensing costs. This approach demonstrates that subject expertise and clear teaching intent, not coding skills, are what drive success.

This process highlights how AI and vibe coding empower Australian educators to move from being passive consumers of commercial EdTech to active creators of bespoke tools tailored to their specific cohort and curriculum goals. Attendees will participate in a live demonstration of building a simulation in under 15 minutes. We will also cover key design considerations to maximize student engagement and learning outcomes.

Target Audience: Design & Technologies (Years 11-12); Digital Technologies (Years 11-12); Mathematics (Years 11-12); Science (Years 11-12)

2.11 Beyond the Paper Plane: Teaching Teams to Think, Test and Adapt

Teresa G Janowski, STEM Fast Track

Teachers will experience this workshop firsthand before planning how to run it in their own classrooms.

Working in teams, participants will design, build and test paper planes across several rounds of changing requirements. After each round, they will use design thinking and Ishikawa's cause-and-effect methodology to examine their results, investigate possible causes and improve their next design. The changing brief also creates opportunities to observe how teams communicate, respond to setbacks and adapt.

The activity is based on workshops Teresa Janowski ran in defence companies to investigate the root causes of product defects. This session adapts that approach into an engaging STEM challenge that educators can use with students. Participants will leave with ideas for adjusting the challenge to their year level, along with the templates used during the workshop as classroom resources.

Warning: You may laugh, have fun and consume an unusually large number of chocolate frogs.

Target Audience: Design & Technologies (Years 7-12); Digital Technologies (Years 7-12); Mathematics (Years 7-12); Science (Years 7-12)

SESSION 3 | 1.50pm - 2.50pm

3.1 Science in their Hands

Dr Katrina Elliott, SA Department for Education: Research, Innovation and Partnerships

In an era marked by misinformation and global challenges, understanding what influences students to value science is critical for fostering curiosity, critical thinking, and informed citizenship.

In this presentation I will share an artefact-based research method that can be readily adapted across school contexts to explore how students identify with and value science. The artefacts served as prompts for dialogic discussions that revealed students' connections to science as deeply personal and shaped by experiences, emotions, and social influences.

The findings demonstrate that an artefact-based method offers a powerful lens for uncovering who and what influences students to value science and reflect their own science identity. Artefacts are a useful pedagogical tool to evidence students epistemic and non-epistemic values of science inclusive in Science as a Human Endeavour and the comparison to Science as a Robotic Endeavour.

Target Audience: Science (Years R-10)

3.2 Hands-On Astronomy in the Primary Classroom.

Robert Hollow, CSIRO

Astronomy is a topic that engages many students but sometimes poses challenges to teach. Whilst there is a wealth of resources and activities available it is often difficult to know which ones are best or most effective. Participants will be introduced to freely available , tested resources aimed at Primary-level students from programs including UNAWE and AstroEdu. Ways of implementing these to address the requirements of the South Australian Curriculum are discussed. Activities provide scope for creativity, literacy, cross-curriculum and cross-cultural perspectives. Examples will be modelled.

Universe Awareness (UNAWE) is a thriving global project with a vision to educate children aged 4-10 years (especially those from underprivileged communities) about astronomy, using a unique combination of scientific and cultural aspects. This hands-on workshop introduces you to a range of freely available UNAWE resources and the ethos behind the project. We will model a range of activities and discuss how they can be implemented in the primary classroom and link to the South Austrlian Curriculum.

Target Audience: Design & Technologies (Years R-6); Science (Years R-10)

3.3 Is our future plastic? Learning experiences that foster critical thinking about materials and sustainable futures

Amy Lloyd, KESAB - Keep South Australia Beautiful

Join environmental educators and the plastics recycling machine from KESAB to explore learning available through materials we find in our bins.

As we move toward a circular economy, students need opportunities to develop the mindsets, values and thinking skills as responsible citizens and consumers. Participants will explore ways to support students to meaningfully connect to content, make sense of data and navigate competing perspectives. To do this, participants will work together engaging in activities, discussing circularity and sharing ways to integrate these themes.

Target Audience: Design & Technologies (Years R-10); Science (Years R-6)

3.4 Future Cities: Designing the Unwritten Future with AI and Architecture

Ella Camporeale, Byrchan Asaris, Paul Cooksey, Ben de Bricassart, Westminster School, ArchiEd

The future is not something students simply prepare for; it is something they will help design.

This interactive workshop, delivered by ArchiEd, an initiative of the Australian Institute of Architects (SA Chapter), introduces a classroom-ready Years 7-10 project in which students use architecture, STEM and generative AI to imagine climate-resilient, technology-enabled future cities.

Using Adelaide as a local case study, and drawing on a school-based Future Cities project developed through collaboration between educators and architects, participants will explore how students can investigate urban density, renewable energy, transport, water, biodiversity, data infrastructure and community needs through a design challenge grounded in real-world trade-offs. The session demonstrates how generative AI can act as a design partner: helping students generate questions, visualise possibilities, test ideas, compare options and justify decisions, rather than replacing human creativity.

Participants will experience a simplified 20-minute Future Cities Sprint that can be adapted immediately for classrooms. Through a structured architecture and futures-thinking activity, teachers will brainstorm building types and future architecture trends, use AI-supported prompt frameworks to generate and refine concepts, and consider how individual ideas can contribute to the design of a future city. The activity showcases how generative AI can support rapid ideation, visual communication and systems thinking within an authentic design process.

Participants will leave with a ready-to-implement project framework, classroom resources, AI prompt strategies and assessment ideas, illustrating how partnerships between schools and ArchiEd can connect STEM learning with authentic architectural practice and future-focused design thinking. Attendees should bring a laptop/device.

Target Audience: Design & Technologies (Years 7-10); Science (Years 7-10)

3.5 Structures and Materials: Building bridges in the classroom, who can design the best bridge?

Stuart Lewis, Scientrific

Have you wanted a STEM activity that can safely explore the strength of materials as well as testing the flexibility of a bridge design?

In this STEM workshop participants will use an integrated STEM approach to design, make and test a bridge structure.

Participants will first conduct a scientific investigation of bridge building materials by gathering data using the Vernier Structures and Materials Tester. The results of this test will then be incorporated into the design and building of a bridge.

Bridges will be analysed using Vernier's Bridge Competition Software.

Target Audience: Design & Technologies (Years 7-12); Science (Years 7-12)

3.6 Using Electronegativity to Make Sense of Bonding

John Drew, Retired DfE Teacher

Year 9 and Year 10 students know about positive charged protons being in the centre of an atom being surrounded by distinct energy shells of negative charged electrons that try to form an octet (8) in the outermost (valence) shell when possible. Nothing new there! However, those three chunks of information combined as a mathematical relation produces a beginners model (with training wheels attached) for electronegativity as the ability for an atom to attract electrons into its valence shell. Can you sense some bonds?

Students can then generate electronegativity trends to explore electronegativity differences and categorise bond types. Internation Union of Pure and Applied Chemistry (IUPAC) oxidation state nomenclature (1) is introduced and quite sophisticated molecular and network bonding patterns and trends can be explored readily before SACE has started. This constructionist lens provides STEM learners with the critical thinking skills necessary to unpack new information and applications encountered during online investigations of existing and emerging technologies.

References

1. IUPAC. IUPAC Compendium of Chemical Terminology, 5th ed. International Union of Pure and Applied Chemistry. [Online] 2025. [Cited: 8 December 2025.] https://goldbook.iupac.org/terms/view/O04365.

Target Audience: Science (Years 7-12)

3.7 Ripples in Spacetime: Bringing Einsteinian Physics and Gravitational Waves to the Classroom

Jyoti Kaur, Jackie Bondell, David Hosken, Flinders university and Swinburne University

What if students could explore the science of the future using ideas that are already reshaping our understanding of the Universe? This hands-on workshop introduces Years 7-10 teachers to modern science concepts from Einstein-First and OzGrav, including curved space, warped time, black holes and gravitational waves. Teachers will experience engaging, inquiry-based activities that make challenging contemporary physics accessible and meaningful for school students. The workshop will demonstrate how modern physics can move beyond traditional curriculum boundaries and inspire students to ask new questions, challenge familiar ideas and imagine what comes next. Join us to explore how we can bring the unwritten future of science into today's classroom.

Target Audience: Science (Years 7-10)

3.8 Beyond the Tuning Fork: My Free Browser-Based Wave Analysis Tools for Physics

Paul Gavini, Morialta Secondary College

This practical session showcases a suite of free, browser-based tools I have developed to make quantitative wave investigations more accessible for Physics classrooms. Requiring no software installation or specialised data-logging equipment, the tools use readily available microphones, speakers and simple laboratory apparatus to collect and analyse real experimental data.

I will demonstrate a range of investigations, including measuring the speed of sound using pulse-echo techniques, comparing measurements in different gases, determining the speed of sound from resonance and harmonic frequencies, analysing harmonics produced by a plucked wire, and investigating the relationship between wire tension and wave speed. I will also demonstrate how the tools can be used to measure beat frequencies and generate controlled sounds for classroom investigations.

A particular focus will be on using these experiments to develop students' science inquiry skills. Comparing techniques and apparatus, such as 1 m and 2 m resonance tubes, provides authentic opportunities to discuss measurement resolution, random uncertainty, systematic error, precision, validity and meaningful experimental improvements.

Participants will leave with free access to the browser-based tools and practical ideas that can be implemented immediately in senior secondary Physics.

Target Audience: Science (Years 7-12)

3.9 Making Purposeful Decisions About Digital Technology Integration

Jennifer Chalmers, Adelaide University

Digital technologies are creating new possibilities for learning in mathematics and science (and beyond). From artificial intelligence and simulations to sensors, coding and data visualisation, teachers have access to an expanding range of tools that can enrich students' learning. However, with increasing choice comes an important question: how do we decide which technologies are more appropriate for a particular learning purpose?

This interactive, research-informed workshop invites participants to explore that question through a collaborative STEM learning experience. Rather than focusing on individual technologies, participants will compare different approaches to digital technology integration and critically examine the opportunities, limitations and trade-offs each presents for supporting inquiry, problem-solving and conceptual understanding. Through hands-on activities and discussion, participants will consider how technology choices can be aligned with learning goals, classroom contexts and the diverse needs of learners.

Drawing on current research and classroom practice, this workshop encourages teachers to move beyond asking "What technology should I use?" towards the more important question: "What learning am I trying to achieve, and how can digital technologies best support it?"

Participants will leave with practical strategies and a shared language for making informed, purposeful decisions about digital technology integration that can be adapted across STEM contexts.

Note: Participants may need their own device to access the internet during the session.

Target Audience: Mathematics (Years 7-10); Science (Years 7-10)

3.10 Empowering Students with Learning Needs in STEM Education

Ana Marques Britto, Thomas More College, MASA

How can we create meaningful STEM learning opportunities for students with learning needs while fostering independence and high achievement? This workshop showcases practical strategies used in high school and disability centre settings, including manipulatives in Mathematics and literacy scaffolds in Science. Drawing on classroom examples, we will explore how targeted supports help students develop confidence, problem-solving skills, and a stronger belief in their own capabilities. Participants will gain practical ideas for inclusive STEM teaching and assessment that promote success both at school and beyond.

Target Audience: Mathematics (Years R-12); Science (Years R-12)

3.11 Teacher voice in action: Small questions, shared insights

Daniel Rogers, Voice Education

What could we learn if teachers had a simple way to share their experiences—and see how others respond?

This interactive, one-hour workshop introduces Voice Education, a brand new Australian educator surveying app. Participants will be guided through downloading the app and answering short questions about teaching, workload, wellbeing and curriculum, before exploring available responses together.

Through discussion and practical activities, we'll consider how regular, low-effort polling can make teacher perspectives more visible. Teachers will explore opportunities to connect through shared experiences, while school leaders will consider how focused questions could inform school priorities and improvement.

Participants will also develop a question relevant to their own context and discuss what makes it useful, clear and meaningful. Along the way, we'll examine the opportunities and limitations of an emerging dataset and how participants can help shape the app's development.

Bring your phone and your perspective. Leave with the app ready to use, a question to explore and practical ideas for strengthening teacher voice in your school.

Target Audience: All teachers and school leaders

SESSION 4 | 3.00pm - 4.00pm

4.1 Invention Engines STEM Project Based Learning

Ben Kelly, Futureneers

Create cross-disciplinary projects introducing Sensors and Actuators to students then allowing them to design and build their own 'invention'. The Invention Engine was designed here in SA and comes with 20 different sensors, perfect for introducing different physics concepts including forced, electricity, light and sound and students can program servos, motors, LEDs, speakers and an 8 bit display as actuators. All designed to be constructed with recycled cardboard or 3D printed materials for older students. We'll run through the different components and how we use them to integrate maths, technology, science and HASS learnings in primary and middle school classrooms.

Target Audience: Design & Technologies (Years R-10); Digital Technologies (Years R-10); Mathematics (Years R-6); Science (Years R-6)

4.2 Teaching Integrated STEAM Learning in Natural Spaces

Kathleen Best, Clarendon Primary School

Natural environments are great for teaching big STEAM concepts while adding authenticity to student learning. This session will cover the challenges and skills you need to teach STEAM in an outdoor natural environment while still ensuring that the curriculum is taught with rigor. Participants will be given handy hints, tips and ideas to help ensure their programs are effective and successful.

Target Audience: Design & Technologies (Years R-10); Digital Technologies (Years R-10); Mathematics (Years R-10); Science (Years R-10)

4.3 How can we bring the ISS down to Earth?

Nixon Lem & Andrew Foo, Beyond Horizon VR, powered by AXR Education

What would it cost to send 25 students to the International Space Station? In this hands-on session, you'll find out by going there. Put on a free-roam VR headset and explore the ISS together, using a module made in partnership with NASA, all within a school gym. We'll then unpack how the experience links to Science (Earth and Space) and Digital Technologies from R–12. We'll also look at how it builds the curiosity and teamwork students need for careers that don't exist yet, here in Adelaide, home of the Australian Space Agency.

Target Audience: Digital Technologies (Years R-12); Science (Years R-12)

4.4 Making Maths Matter: Connecting Classroom Learning to Real Life

Hilary Schubert-Jones, Future You - UNSW

How can we help students see mathematics as something they use, not just something they study?

This interactive 60-minute workshop showcases a suite of free curriculum aligned resources designed to contextualise mathematical concepts and skills through authentic everyday situations and potential career pathways. Participants will explore adaptable classroom activities that connect topics such as number, measurement, algebra, statistics, probability and financial mathematics to the decisions, challenges and opportunities students may encounter beyond school.

Focusing on resources for the Year 3-7 National Curriculum strands that highlight the many ways mathematics is used across diverse fields, including health, computing and construction amongst others, via relatable real life role models, students can self-identify how the skills they are learning are practicably applicable. The workshop will model how these real-world contexts and resources can increase student engagement and support meaningful mathematical understanding.

Teachers will leave with a bank of ready-to-use ideas, strategies for adapting the resources to their own classes, and approaches for helping students recognise the relevance and value of mathematics in their lives, communities and possible futures.

Target Audience: Mathematics (Years R-10)

4.5 Take learning to the sky

Dr Brendan Jackson, Immersive Education

This session demonstrates two classroom-ready projects and the teaching practice behind them.

Firstly, aviation. We fly a student-built aircraft on a centripetal thrust generator, then demonstrate the modification cycle students use to bring aviation theory to life: change one variable (aspect ratio, angle of attack, stabiliser shape), predict the effect, measure the outcome, explain the gap. Measurement, speed, percentage change, forces, energy and simple circuits all arrive through the goal of making something fly better.

Secondly, rocketry. Approached through the lens of stability. Participants learn to locate centre of mass and centre of pressure on demonstration rockets, run stability swing tests, and see what a poor stability margin does to a rocket's flight trajectory. From there the mathematics opens up all through a real-world context: Newton's laws, trigonometry calculations, speed and acceleration.

No prior aviation or rocketry experience is assumed. Come ready to watch things fly, test some theories and leave with a clear picture of what implementation actually involves. Suitable for both Primary (Grades 5& 6) and Secondary school classrooms.

Target Audience: Design & Technologies (Years R-10); Mathematics (Years R-10); Science (Years R-10)

4.6 Starting in STEM: Designing Impactful STEM Projects

AJ Fairey, Questacon

STEM education is more than science, technologies, engineering and maths - it's about fostering critical thinking, developing curiosity and creativity, and embracing student agency, to grow resilient, confident, and prepared young people.

In this workshop, educators will explore how to design and implement meaningful STEM projects using Questacon's Starting in STEM framework. You will learn how to create sustainable, place-based, real-world learning experiences that engage students and transform classrooms.

You will gain:

- Practical strategies for integrating STEM, no matter your background
- Tools for engaging students in problem-based learning
- The opportunity to join Questacon's virtual Community of Practice for ongoing support

This workshop is ideal for educators at any stage, whether you are just starting out or looking to deepen your practice and expand your professional network.

Target Audience: Design & Technologies (Years R-10); Digital Technologies (Years R-10); Mathematics (Years R-10); Science (Years R-10)

4.7 Could data save Humpty? An new approach to impulse experiments with datalogging that work

Stuart Lewis, Scientrific

Have you wanted a way to tie impulse experiments to the real world and STEM?

This impulse based workshop is a reworking of the classic experiment. With datalogging technology it can become a deeper, safer, a non-anaphylactic hands-on workshop.

The workshop challenges participants to design and test a device to prevent the fracturing of an egg (simulated in the design and testing phase) when dropped. Using a force sensor, the collision length and forces can be measured so that the testing phase can reflect the alterations of their design before any real eggs are used.

Don't worry about the mess! We will clean it up if your design doesn't 'work'.

Target Audience: Design & Technologies (Years R-12); Science (Years R-12)

4.8 Mission Ready: Commission Your Own Classroom Satellite

Edward Robinson, Robinson Aerospace Systems

Step into the role of a spacecraft engineer and commission a working classroom satellite in just 60 minutes. Participants will connect and test a RASCube, examine live sensor data, conduct a simple mission and troubleshoot their spacecraft against real engineering requirements. This practical workshop demonstrates how one platform can bring science, technology, engineering and mathematics together through an authentic space mission, without specialist facilities or complicated lesson preparation.

Target Audience: Design & Technologies (Years 7-12); Digital Technologies (Years 7-12); Mathematics (Years 7-12); Science (Years 7-12)

4.9 Classroom Astronomy in the Era of Big Data

Robert Hollow, CSIRO

Astronomy can be regarded as a Gateway Science that inspires students and the public into STEM pathways. A strength is that it is a discipline in which real scientific data is freely and easily accessible, making it an ideal area for first-hand and second-hand student investigations. This workshop introduces participants to a range of Australian and international datasets, where to access and how to use them to engage and challenge students. Facilities and databases such as Murriyang, CSIRO's Parkes radio telescope, the Sloan Digital Sky Survey, the NASA Exoplanet Archive, the Vera C. Rubin Observatory plus a diverse range of Zooniverse citizen projects are introduced. Topics from exoplanets, pulsars and galaxy classification are explored, with key databases and science tools being identified. Participants will work through examples of some datasets and use online tools for data analysis and visualisation that they can readily implement in their classrooms. Participants will need to bring a device to work on. This workshop is suitable for those teaching 7-10 Science as well as teachers of senior Physics.

Target Audience: Digital Technologies (Years 7-12); Science (Years 7-12)

4.10 Beyond Prompting: Advanced Reusable AI Workflows with Codex and Agentic AI

Paul Gavini, Morialta Secondary College

This workshop is designed for adept users of generative AI who are ready to move beyond basic prompting into structured, reusable AI system design. It is intended for educators already own tools such as ChatGPT Plus, the upcoming EdChat AI (DfE schools only), Claude, or similar platforms, and who want to increase consistency, scalability, and control in their AI-assisted workflows.

While many educators rely on one-off prompts to generate lesson materials, assessments, or resources, this often leads to variability and limited reuse. This session introduces a more advanced paradigm: treating AI interactions as modular systems rather than isolated exchanges.

Participants will explore the design and implementation of reusable AI workflows through Markdown-based instruction files, structured project rules, reusable skills libraries, and agent-based orchestration patterns. While demonstrated in Codex, these approaches are platform-agnostic and transferable to tools such as ChatGPT Plus workflows, EdChat AI environments, Claude, and other emerging educational AI systems.

A key focus is the integration of rubric-driven AI evaluation. Participants will learn how to embed assessment criteria directly into workflows, enabling AI systems to self-evaluate outputs, identify gaps, refine responses, and iterate until predefined quality thresholds are met. This introduces a controlled feedback loop that improves reliability and pedagogical alignment.

Although aimed at adept users, the session provides clear conceptual scaffolding for those transitioning from intermediate practice. The emphasis is on developing durable, portable skills that can be applied across multiple AI ecosystems rather than reliance on any single tool.

By the end of the workshop, participants will have a practical, advanced framework for designing, deploying, and refining AI workflows that are consistent, auditable, and reusable. They will be equipped to apply these systems immediately to complex professional tasks such as curriculum design, assessment development, differentiated resource creation, and subject-specific content generation-while remaining adaptable to future AI platforms and capabilities.

Target Audience: Digital Technologies (Years 7-12); Mathematics (Years 7-12); Science (Years 7-12)

4.11 Can a Minecraft World Change the Real One?

Julie Erikson & Claire Hughes, Zoos South Australia (Zoos SA)

Can a Minecraft world help students tackle real-world conservation challenges?

This interactive workshop explores how Eco Detectives, a Minecraft Education experience focused on biodiversity and conservation, can be used to engage students in sustainability, critical thinking, collaboration, problem-solving and systems thinking through game-based learning. The program challenges students to investigate environmental issues across diverse ecosystems and consider actions that support biodiversity and conservation.

Participants will explore practical ways to use Minecraft as part of a broader STEM and sustainability learning experience that connects digital learning, digital play and real-world environmental challenges. Drawing on Zoos South Australia's conservation education approach, the session will demonstrate how game-based learning can provide accessible and engaging entry points for a wide range of learners, complement hands-on experiences, deepen engagement with biodiversity, and support meaningful connections between digital learning and conservation action.

Participants will leave with practical ideas, curriculum connections and resources to inspire curiosity, foster environmental stewardship and empower students to become the next generation of conservation changemakers.

Target Audience: Digital Technologies (Years R-10); Science (Years R-10);

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