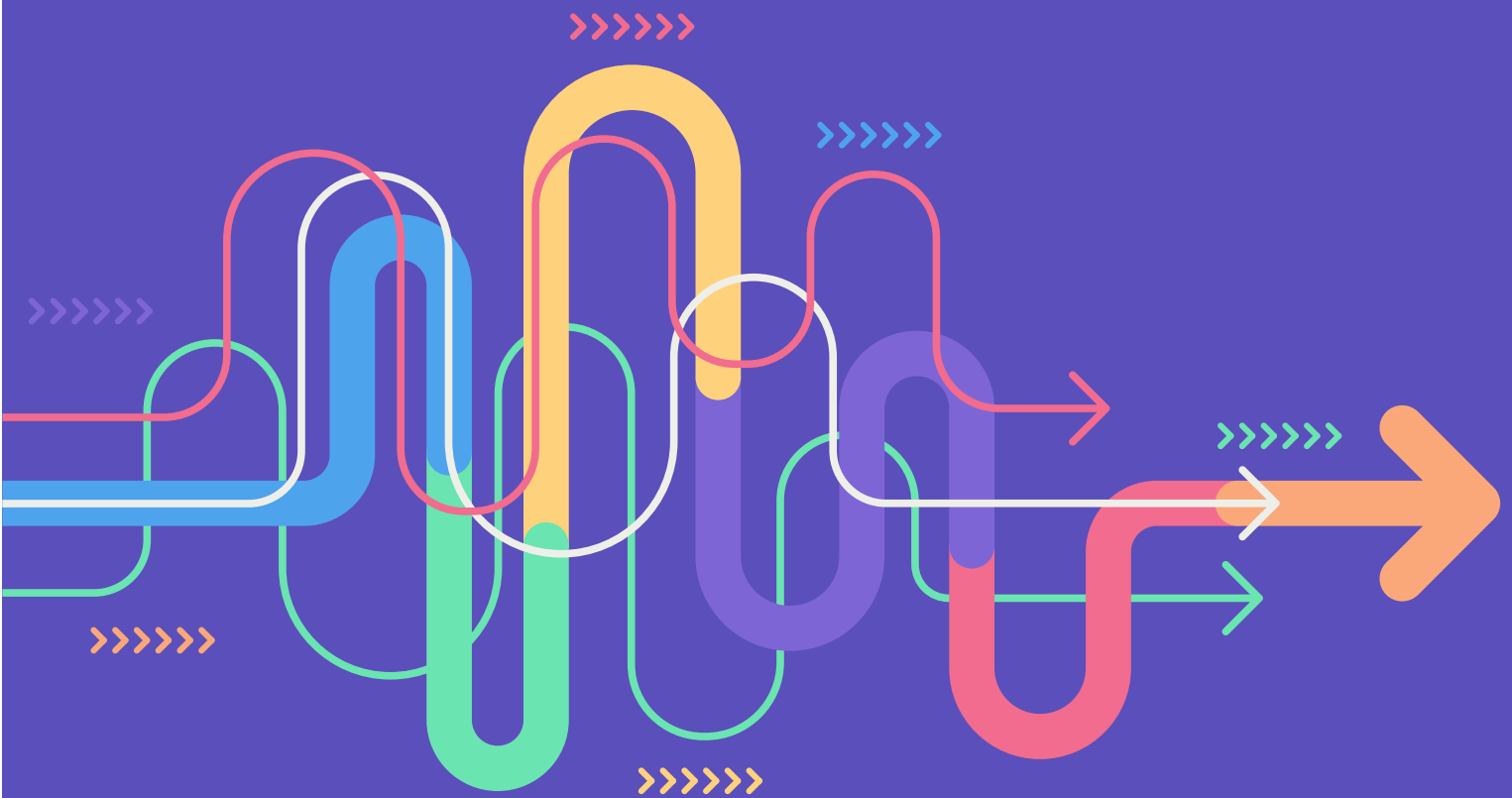# STEM CONFERENCE

YEARS R-12

FRIDAY 29 NOVEMBER 2024
UNISA MAWSON LAKES

Harnessing STEM: Empowering Innovators

CONFERENCE PROGRAM

HOSTED BY:

DATTA South Australia — Design And Technology Teachers Association

EdTechSA Inc.

MASA — Mathematical Association of South Australia

SASTA — South Australian Science Teachers Association

PROGRAM OUTLINE

8.00am	Registration | Tea & Coffee	Foyer
8.40am - 9.00am	Welcome & Housekeeping	EW Wills Lecture Theatre
9.00am - 10.00am	Keynote Presentation	EW Wills Lecture Theatre
10.05am - 10.35am	Morning Tea	D Building
10.40am - 11.40am	Workshop Session 1	Various
11.50am - 12.50pm	Workshop Session 2	Various
12.45pm - 1.45pm	Lunch	D Building
1.50pm - 2.50pm	Workshop Session 3	Various
3.00pm - 4.00pm	Workshop Session 4	Various
4.00pm - 5.00pm	Happy Hour	Courtyard

REGISTRATION PRICES

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

PLATINUM SPONSORS:

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# KEYNOTE PRESENTATION

Professor Mark Hutchinson

Prof Mark Hutchinson has been recently appointed as the Director of the Institute for Photonics and Advanced Sensing (IPAS). As a Professor of Biomedicine and lead the Neuroimmunopharmacology laboratory at the University of Adelaide, Prof Hutchinson has a strong record of leadership of successful teams. His expertise spans diverse basic science methods for human and animal research, including biomarker identification, multiomics and complex data analytics. He has a strong record of engagement with consumers and industry and an advocacy for their involvement in research. Hutchinson has a strong record of commercial translation between basic science and knowledge utilisation. Prof Hutchinson has diverse leadership and Ministerial appointments, including being a member of the Prime Minister's National Science and Technology Council, and the Australian Economic Accelerator Board. He also serves as the chair of the Safeguarding Australia through Biotechnology Response and Engagement (SABRE) Alliance and is the chair of the Australian Pain Solutions Research Alliance board.

Harnessing STEM: Empowering Innovators With Hope and Convergence

In this keynote address, Professor Mark Hutchinson will explore the transformative power of STEM education in fostering innovation and shaping the future. Drawing from his extensive experience as a pioneering researcher and leader in interdisciplinary science, Professor Hutchinson will discuss how integrating hope, trust, and convergence into STEM education can empower the next generation of innovators. He will share insights from groundbreaking initiatives like the ARC Centre of Excellence for Nanoscale BioPhotonics and the SABRE Alliance, demonstrating how these approaches can be adapted to classroom settings to inspire students and prepare them for the challenges of tomorrow. The talk will emphasise the importance of cultivating 'comb-shaped' learners, fostering interdisciplinary collaboration, and embedding intentional hope in educational practices to drive innovation in STEM fields.

GOLD SPONSORS:
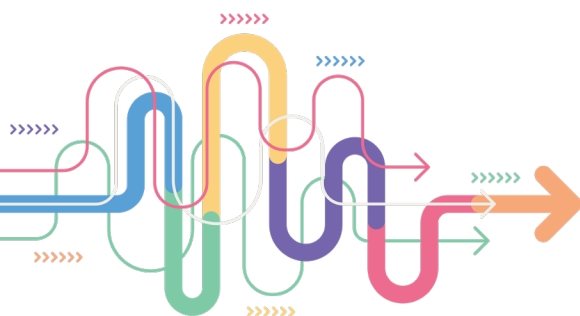
Adobe will be running a fun activity at Happy Hour!

Adobe Firefly Face-Off: Test your AI prompting skills by observing an image generated using Adobe Firefly then recreating the image in an Adobe Express Template. Submit your image to go into the running to win Adobe swag.

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	Food & Textiles
30 minute sessions (choose 2)	1.01a	Your future in the Space Industry, Year 9/10 Science as a Human Endeavour Investigation Task		●						●	
	1.01b	The thing about Plastic - A integrated learning opportunity for students with special needs		●	●					●	
	1.02a	AI-Powered Primary Classrooms: Shaping the Future of Learning	●					●		●	
	1.02b	Great Southern Reef VR Experience	●	●	●					●	
	1.03a	Transformative Power of Design Thinking in Primary Education	●	●			●	●			
	1.03b	Robotics for every year level	●	●	●		●	●			
	1.04a	Effective teaching of D& T in primary - CANCELLED	●				●				
	1.04b	Closing the gender gap: How teachers can empower girls in STEM	●	●	●		●	●	●	●	●
	1.05a	Uncovering the Evidence: A Student-Driven Forensics Course for Engaged Learning		●	●		●	●	●	●	
OR	1.05b	Empowering Education: Leveraging AI as a Collaborative Partner	●	●	●		●	●	●	●	
1 hour sessions (choose 1)	1.06	Teaching mathematical concepts with understanding as a focus - SESSION CANCELLED		●	●				●		
	1.07	STEM - A whole school approach	●	●	●		●	●	●	●	
	1.08	Connecting Tech, Math and Science through student agency		●	●		●	●	●	●	
	1.09	Making Sense of Sensors: Building and Calibrating Sensors for Citizen Science		●	●		●	●	●	●	

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	Food & Textiles
2.01	Developing student skills through Problem-Based Learning	●				●	●	●	●	
2.02	Hackathon - Game Design + Maker Space for Sustainability	●	●			●	●		●	●
2.03	Metacognition and Modelling Strategies	●	●						●	
2.04	Exploring the SA Curriculum: Science	●	●	●					●	
2.05	The PRIMO Project (Secondary)		●					●		
2.06	Case Study: How Blackfriars Priory School has implemented an impactful STEM education program.		●						●	
2.07	Mozzie Monitors in Schools	●	●						●	
2.08	Laser Technology and Adobe Illustrator		●	●		●	●			
2.09	Harnessing XR and AI Technologies for Experiential STEM Learning	●	●	●		●	●			
2.10	Interactive Tasks in Maths Classes			●				●		

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	Food & Textiles
3.01	Smart Gardeners	●				●	●	●	●	
3.02	ArchiEd - Architecture in Curriculum	●	●	●		●				
3.03	From Slime to Sustainability - Discovering connections between STEM and Chemical Engineering	●	●	●				●	●	
3.04	Kicking goals with trigonometry: video-enabled maths in the real world		●					●		
3.05	Diving into STEM: Empowering Students through project based learning with the South Australian Curriculum for Public education.		●			●	●	●	●	
3.06	Oral SATs as an Alternative Assessment in Mathematics		●	●				●		
3.07	Giving Hope Hands: How Sustainability Drives Optimism and Agency in STEM Education		●	●		●	●	●	●	●
3.08	Running SACE Food Technology under DesignTechnology & Engineerings - Material Solutions Food			●		●				●
3.09	STEM approaches using Data Loggers		●	●		●			●	

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	Food & Textiles
4.01	Minecraft Madness - SESSION CANCELLED	●				●	●	●	●	
4.02	Computational Thinking and AI – Responsible STEM in Action	●	●			●		●		
4.03	Questacon: Connecting STEM Capacity, Culture, and Community	●	●	●		●	●	●	●	●
4.04	Accessible Filmmaking and Media Arts in the K-9 Classroom	●	●	●		●	●			
4.05	Applying an interdisciplinary approach to immersive reality		●	●		●	●	●	●	●
4.06	Astronomy, a Gateway Science into STEM		●	●				●	●	
4.07	An Asteroid Redirect Test (Based on DART) - An adventure in coding, maths and science!		●				●	●	●	
4.08	Structures and Materials: Building bridges in the classroom, who can design the best bridge?		●	●		●			●	
4.09	Get your hands on the next generation of handheld graphic calculator technology – a walk-through.			●				●		
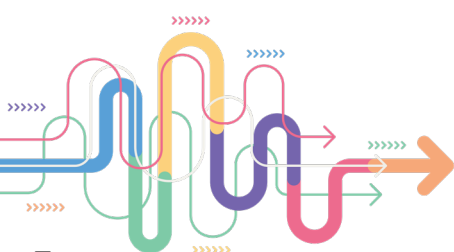
WORKSHOP DESCRIPTIONS

SESSION 1 | 10.40am - 11.40am

30 MINUTE SESSIONS (CHOOSE 2)

1.01a Your Future in the Space Industry, Year 9/10 Science as a Human Endeavour Investigation Task

Kathy Coombs, Kapunda High School and Maddy Parks, Space Discovery Centre

The Space Discovery Centre opened at Lot fourteen in March 2021, providing science, technology, engineering and mathematics (STEM) education, engagement and inspiration for young Australians. This workshop will present an investigation task for students in year 9 or 10 to explore and discover potential career paths in the space industry with contemporary real time resources including an excursion to the Space Discovery Centre. The workshop will include all task materials, included scaffolded supports and peer assessment material. Participants will hear more about learning opportunities provided by the Space Discovery Centre and have time for to engage with resources and links from the SDC and CSIRO about careers in the space industry.

Target Audience: Science (Years 7–10)

1.01b The thing about Plastic - A integrated learning opportunity for students with special needs

Veronica Wiley, Parafield Gardens High School

This workshop will showcase the learning of special needs students at Parafield Gardens High School through an integrated science unit investigating plastic pollution in our environment, culminating in the creation of a green wall using plastic waste. Participants will gain ideas and resources to use in their own classrooms while improving student knowledge of sustainability and scientific inquiry.

Target Audience: Science (Years 7–12), Students with special needs

1.02a AI-Powered Primary Classrooms: Shaping the Future of Learning

Tom Jenkinson, Immanuel Primary School

This session will focus on Generative AI in the Primary Classroom, where we explore the transformative potential of AI tools to enhance both student learning and teacher resource development. This session will introduce practical ways to integrate AI into the primary classroom, empowering educators to create dynamic, personalised learning experiences that cater to diverse student needs. We will delve into how Generative AI can be utilised to develop interactive lesson plans, generate creative writing prompts, and design engaging activities that foster critical thinking and creativity among young learners.

Whether you're new to AI or looking to expand your toolkit, this session will provide valuable insights and hands-on strategies to effectively incorporate Generative AI into your teaching practice, ensuring a more innovative and efficient approach to education. Don't miss this opportunity to harness the power of AI to enrich your classroom and elevate your teaching resources.

Target Audience: Digital Technologies (Years R-6), Science (Years R-6), Classroom teachers (Years R-6)

1.02b Great Southern Reef VR Experience

Bailee, Experiencing Marine Sanctuaries

A VR experience showcasing the Great Southern Reef accompanied by a presentation discussing sustainability and conservation. Example of an incursion available for schools.

Target Audience: Science (Years R-12)

1.03a Transformative Power of Design Thinking in Primary Education

Teresa Janowski, Stem Fasttrack

At Mt Waverley Heights PS, the integration of Inquiry Learning had reached a plateau. To overcome this challenge, I was invited to inject some spark and share my Design Thinking experience. The students embarked on a project where they chose an endangered animal, studied it, and identified ways to help it. The results were astounding, especially considering the students involved were only in year 3! The depth of empathy these young learners demonstrated was remarkable, and with guidance, they mastered the art of brainstorming, generating an impressive array of ideas.

This session will explore the transformative power of Design Thinking in primary education. Attendees will learn how to harness students' natural empathy and creativity to solve real-world problems. Examples of student projects will be shared, including the use of AI to create educational books for year 1 students, entrepreneurial ventures like selling animal-shaped cookies, innovative applications of technology such as laser-cut model sanctuaries, and the development of fostering programs for animals like Wilbur the Wombat.

Join us to discover practical strategies for invigorating your teaching practice and empowering your students to achieve extraordinary outcomes through Design Thinking.

Target Audience: Design & Technologies (Years R-10), Digital Technologies (Years R-10)

1.03b Robotics for every year level

Emil Zankov, DATTA SA

Find out about the VEX Robotics platform for Years R-12, you'll get to see VEX 123,Go,IQ,EDR which are platforms specifically designed for different year levels. In this short 30 min presentation, I'll show examples of assignments we have done across our Junior, Middle and Senior schools and the free training resources used to up-skill our teachers. I'll discuss how we mapped our learning across subject areas incorporating robotics to enhance the disciplines of STEM.

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

1.04a Effective teaching of D&T in primary classroom

Larry Spry, UniSA

Adapting the 4 S conceptual framework system for effective teaching to teach & organise D & T in a primary classroom effectively. Strategies and teaching approaches.

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

1.04b Closing the gender gap: How teachers can empower girls in STEM

Maria Vieira, UniSA

Where are all the women in STEM? Educators are increasingly concerned by the decline in female participation in STEM classrooms, making it a central topic of discussion within the teaching community. But are the existing programs and pedagogical approaches available really addressing the root causes of this issue? To truly close the gap, we must focus on equipping girls with the skills and confidence to confront and overcome the deeper, systemic barriers contributing to gender disparities in STEM. In this presentation, Maria Vieira will offer practical insights into how teachers can create classroom environments where girls feel safe and supported to take risks and engage meaningfully with STEM subjects. She will also share concrete examples, including a case study, and introduce free resources developed by her and her team of educational researchers at UniSA.

Target Audience: Design & Technologies (Years R-12), Digital Technologies (Years R-12), Food and Textiles (Years R-12), Mathematics (Years R-12), Science (Years R-12)

1.05a Uncovering the Evidence: A Student-Driven Forensics Course for Engaged Learning

Jarrod Johnson, Pulteney Grammar School

Jarrod Johnson's Year 10 Forensics course takes a unique, student-driven approach to learning, blending open-ended tasks with problem-based investigations. Students explore fascinating topics such as human autopsy, ballistics, and blood spatter analysis, gaining experience in many areas. The course culminates in a challenging crime scene scenario where students apply everything they've learned to solve a simulated case. This innovative format allows students to choose topics that interest them while building core scientific skills, making it an engaging and personalised learning experience. Teachers will leave inspired to create flexible courses that enhance student choice and foster deeper learning.

Target Audience: Design & Technologies (Years 7–10), Digital Technologies (Years 7–10), Mathematics (Years 7–10), Science (Years 7–10)

1.05b Empowering Education: Leveraging AI as a Collaborative Partner

Jarrod Johnson, Pulteney Grammar School

In this session, Jarrod Johnson will explore the transformative potential of AI as a collaborative partner in the classroom. Drawing on his extensive experience and real-world applications, Jarrod will showcase strategies for using AI to enhance student research, scaffold learning tasks, review academic work, and provide personalised tutoring. The presentation will address the "Academic Integrity, Plagiarism, and Artificial Intelligence" framework, but the primary focus will be on practical pedagogical approaches for educators. Attendees will gain insights on how to integrate AI seamlessly into teaching practices to foster student engagement and critical thinking, using AI as a collaborative partner. This session is ideal for educators looking to navigate the intersection of technology and pedagogy, equipping them with tools and techniques to support effective AI-student collaboration in diverse learning environments.

Target Audience: Design & Technologies (Years R–10), Digital Technologies (Years R-10), Mathematics (Years R-10), Science (Years R-12)

SESSION 1 – CHOOSE 2 X 30 MINUTE SESSIONS TO ATTEND OR 1 X 1 HOUR SESSION

1 HOUR SESSIONS (CHOOSE 1)

1.06 Teaching mathematical concepts with understanding as a focus

Deb Woodard-Knight, Private Consultant - Mathematics Teaching

I believe the time taken to teach concepts with a focus on the understanding rather than students blindly following algorithms is time well spent. With this approach students will retain knowledge rather than lose it after 'learning for the test' and be able to build a more solid background in mathematics. Students experiencing this approach will naturally think to include their background knowledge and openly discuss problem solving approaches. In an environment where students' ideas are valued, they develop mathematical language skills and their ability to logically discuss their reasoning. In this session I will demonstrate this style of teaching using middle school and senior school examples. Participants will be offered opportunities to present ideas.

Target Audience: Mathematics (Years 7-12)

1.07 STEM - A whole school approach

Joanne Villis and Lana Weller, St Dominic's Priory College

Implementing a comprehensive STEM education strategy presents many challenges, from limited funding and resources to navigating a crowded curriculum and identifying specialist teachers. Additionally, determining who will oversee such an initiative is often unclear. In this session, Joanne and Lana will share how they have collaborated over the past two years to establish a vibrant, STEM-rich environment at St Dominic's Priory College, all while working within a limited budget. They will highlight innovative programs, community connections, and practical approaches that have successfully engaged girls in STEM learning.

Target Audience: STEM (Years 3-11)

1.08 Connecting Tech, Math and Science through Student Agency

Andy Stone and Kyran Zippel, Australian Science and Maths School

The ASMS utilises an interdisciplinary curriculum across years 10 and 11. In semester 1 this year, one of these studies was named Dream, Design, Develop (DDD), which had a strong STEM focus, incorporating themes and assessment of Technology, Maths and Science, embedded in a framework that supported student agency in both their learning pathway and the evidence of learning (or EoL) they submit for assessment. In this session, we will share how we approached this, selected resources, our challenges and our success stories.

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

1.09 Making Sense of Sensors: Building and Calibrating Sensors for Citizen Science

Colin Chapman, Caroline Chisholm Catholic College

This session will encourage participants to experience the build, calibration and testing of a light sensor and a temperature sensor from cheap components. The sensors will be built around the Arduino microcontrollers. Participants will calibrate their sensors using everyday standards and the curve-fitting capabilities of a typical spreadsheet application. Participants will collect data using the sensors and use a variety of open-source tools to process the data in order to enrich citizen science-informed science investigations. A variety of Inquiry ideas for higher-order investigations in science, that evoke responses across all of the VCAA Command Terms will be shared with the participants.

Target Audience: Design & Technologies (Years 7-12), Mathematics (Years 7-10), Science (Years 7-10)

SESSION 2 | 11.50am – 12.50pm

2.01 Developing Student Skills through Problem-Based Learning

Sue Gaardboe, Department for Education

Problem-Based Learning (PBL) has a long history of use as a student-centred, highly engaging pedagogical teaching approach. Recent research focused on measuring student critical and creative thinking skills has demonstrated the positive effects of Problem-Based Learning on developing student skills. The use of an industry partner to provide a genuine, unsolved, complex, real-world problem for primary school students to investigate further increases the positive effects of helping students use and develop their critical and creative thinking skills. The Department for Education in South Australia has recently completed a successful pilot study investigating the feasibility of training primary school teachers in using PBL with industry partners. This workshop will describe the research background for the use of PBL with primary school students. The process of implementing PBL with an industry partner in primary school classrooms will be explained, and information will be provided on a limited program being run through the Department for Education 2025.

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

2.02 Hackathon - Game Design + Maker Space for Sustainability

Claire Bowmer, Claire Richards Art

Presentation: Practical processes and steps for scaffolding game design projects. Providing a series of LO-FI and AI planning processes to scaffold world creation stage of development. See examples from the presenter's practice of these storyboarding processes in multi-platform storytelling. Consider how we can use the worlds in games to introduce concepts of ecosystems and systems thinking.

Hackathon Challenge: Work together on paper to create big-picture ideas for units. These would be for non-specialist primary teachers to utilise the design cycle and try a maker space project. There will be a discussion about the realities of collaboration. This session brings together both digital technologies and design and technologies to address real-world dilemmas. Using game design and the optimism of solar punk to consider how to guide students in an engaging STEM project.

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

2.03 Metacognition and Modelling Strategies

Katrina Elliott, Mark Oliphant College B-12

The Australian Curriculum: Science V9.0 has intentionally introduced modelling in the inquiry strand to support real-world science and develop the core concept: mathematical thinking underpins science practices of representing objects and events, analysing data and modelling relationships. In this workshop, we will use metacognitive strategies to provide opportunities to present new concepts for deep understanding for students. Why do scientists use models? How students can create a model or representation of phenomena using data? How do scientists use models for predicting, such as climate change? How do we know if a model works?

Target Audience: Science (Years R-10)

2.04 Exploring the SA Curriculum: Science

Anthea Ponte and Denise Rule, South Australia Department for Education

In South Australia, we want to empower our children and young people with the dispositions, capabilities and knowledge they need to thrive in a constantly changing world.

That's why we're adapting the R to 10 Australian Curriculum V9 to develop an SA curriculum for Public Education. We want to support meaningful and authentic teaching, learning, and assessment in our public schools. We aspire to develop a curriculum framework that reflects what students will be able to understand, do, and be as a result of their learning at school.

This session will outline and explore the essential knowledge, capabilities and dispositions that form the SA Curriculum: Science.

Target Audience: Science (Years R-12)

2.05 The PRIMO Project (Secondary)

Vanessa Gorman and Mark Ward, South Australia Department for Education

The South Australian Department for Education (DfE) acknowledges the critical importance of developing effective mathematics learners who can navigate their modern world. To achieve these aims, DfE has partnered with the Center for Curriculum Redesign (CCR), based in Boston, USA, to undertake a four-year project known as the PRIMO Project.

This project has involved 12 months of in-depth teacher professional learning of modern mathematics topics that align with explicit teachable competencies. Our teachers are now transforming their learning to produce student-facing Year 10 mathematics units that align with the newly developed South Australian Curriculum: Mathematics. The teachers involved in PRIMO will deliver these units to their students in 2025.

Please join us to hear more about PRIMO.

Target Audience: Mathematics (Years 7–10)

2.06 Case Study: How Blackfriars Priory School has implemented an impactful STEM education program

Matthew Wallace and Duro Dobrijevic, Blackfriars Priory School

Over the past eight years, Blackfriars has successfully implemented an integrated STEM program. Our journey has been both rewarding professionally and engaging for the students. We look back over the evolution of STEM at Blackfriars, what we have learned, how we have leveraged technology and some examples of our successful projects.

Target Audience: Science (Years 7–10)

2.07 Mozzie Monitors in Schools

Craig Williams, University of South Australia and Debbie Devis - Education Futures Academy- UniSA

Mozzie Monitors has engaged members of the public across Australia to participate in mosquito surveillance. This model of Citizen Science can play an important role in the environmental monitoring of biodiversity and health risks. The Mozzie Monitors in Schools project seeks to extend the existing Citizen Science activity into schools.

The program has been improved to better support teachers in delivering mozzie monitors to their students.

This session will provide:

* Activities and knowledge to facilitate student participation in citizen science
* Prepare and equip them for leading class mosquito trapping and identification in the Mozzie Monitors program
* Provide curriculum-linked educational resources for in-class activities
* Participation in citizen science is a great way of gaining hands-on experience in science and engaging with nature.

Target Audience: Science (Years R-10)

2.08 Laser Technology and Adobe Illustrator

Angelo Benn, Squircle Learning

Adobe Illustrator has established itself as one of the best graphic software in the design world. Its ability to work with Raster and Vector formats has given it a broad scope in the industry. However, its wide range can also challenge users (old and new).

The full training lasts two days and covers detailed topics on using Illustrator with the laser machine. This 60-minute session briefly introduces Illustrator and how to use it in the context of a laser cutting and engraving machine.

The session will focus on developing templates and toolbars which are the foundational tools for generating laserable artwork without getting overwhelmed with the general uses and tools of Illustrator. Not understanding how to develop your own toolbars and templates is the main reason people shy away from using Illustrator in a classroom environment.

By the end of this session, participants will learn the use of templates in a classroom environment, which is extremely helpful for students starting off with using Illustrator and will create one template and a basic toolbar to use with students.

Target Audience: Design & Technologies (Years 7-12), Digital Technologies (Years 7-12)

2.09 Harnessing XR and AI Technologies for Experiential STEM Learning

Colleen O'Rourke, The Hills Christian Community School and Tim Gentle - Think Digital

In the dynamic landscape of education, integrating innovative Extended Reality (XR) and Artificial Intelligence (AI) technologies is transforming STEM classrooms into immersive learning hubs. This workshop features a range of innovative XR technologies being used at HILLS in partnership with Uni SA, including a unique AI-Driven XR Avatar, which students and teachers can customise to elevate STEM education across primary and secondary levels. Participants will explore how these immersive technologies not only boost engagement but also enhance personalised learning, deepen conceptual understanding, and provide real-time feedback to students. This session will also explore how HILLS connects these technologies to biological sciences and nature education, demonstrating how XR can bring environmental studies to life. With hands-on demonstrations and interactive activities, educators will gain practical insights and strategies to effectively incorporate a range of tools, fostering engaging and dynamic learning environments.

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

2.10 Interactive Tasks in Maths Classes

Liwen Seto, Flinders University

Students often bring negative perceptions of mathematics to the classroom, which can manifest as a reluctance to engage through feelings of mathematics anxiety. To address this, we have trialled introducing fun and interactive activities into university bridging mathematics classes, covering concepts similar to year 11 level, to enhance hands-on exploration and deepen conceptual understanding. Through a series of carefully designed activities, students engage in solving real-world problems that require the application of mathematical concepts and critical thinking skills. These tasks are structured to encourage collaboration, creativity, and problem-solving, with a focus on practical applications of mathematical theories. Examples include crime scene blood splatter investigation using Trigonometry, "Desk Hop Linear Match" for the students to learn different forms of linear functions; and using bags of lollies with different weights to demonstrate Weber's Law. We will demonstrate these activities and report on how these have transformed our classrooms.

Target Audience: Mathematics (Years 11-12)

SESSION 3 | 1.50pm - 2.50pm

3.01 Smart Gardeners

Karen Butler, Department for Education

Engaging primary students in growing food and fibre can provide fertile ground for connecting science, mathematics, technologies and engineering. This workshop looks at harnessing these interconnections through growing and automating a system to look after your plants using micro:bits.

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

3.02 ArchiEd - Architecture in Curriculum

Ella Camporeale, Westminster School, Brychan Asaris, Russell & Yelland Architects, Paul Cooksey, Northern Edge Studio, Ben de Bricassart, Das Studio, Valentina Baldizzone, DASH Architects, on behalf of ArchiEd (SA Chapter of the Australian Institute of Architects)

This workshop will be presented by members of the Archi Ed Committee - Architects and Teachers - and will provide an overview of how to integrate Architecture into the curriculum for meaningful STEAM experiences through approaches to design thinking, construction, building performance, energy efficiency and sustainability goals. Archi Ed is an initiative of the SA Chapter of the Australian Institute of Architects. Our aim is to share our love of design and encourage an appreciation of architecture and the built environment in school students and the wider community. We facilitate architecture and design workshops and presentations that relate to a variety of key learning areas. Examples include a workshop on Regenerative Design as part of the Nature Festival targeted towards upper primary students and addressing ACARA cross-curriculum priorities and a co-designed unit of work on Biomimicry with Adelaide Botanic Gardens mapped to ACARA 9-10 Technologies and SACE Stage 1 Design, Technology and Engineering.

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

3.03 From Slime to Sustainability - Discovering Connections between STEM and Chemical Engineering

Michelle McLeod, COSMOS Magazine and Dr Diana Tran - School of Chemical Engineering, University of Adelaide

What will the world look like in the future? Chemical engineers play a pivotal role in producing our modern world and solving fundamental issues facing the planet today. Working across every industry to develop sustainable ways of manufacturing and production, chemical engineers are linking sectors together to help address the United Nations Sustainable Development Goals. Join this workshop to enhance connections between STEM industry application and STEM classroom learning. During this session, you will be introduced to a range of resources suitable for primary and secondary classrooms. Showcased activities provide hands-on student experiences, develop critical and creative thinking, engage group work and collaboration skills, and inspire a deeper understanding of STEM study and career pathways. Build your collection of STEM resources and help your students find their path to solving the fundamental issues facing our planet.

Target Audience: Mathematics (Years R-10), Science (Years R-12)

3.04 Kicking goals with trigonometry: video-enabled maths in the real world

Alastair Lupton, Adelaide Botanic High School

"Do maths in the real world" is the cry. It adds meaning, relevance, and challenge, they say. Sounds good in theory – but what if I don't like excursions? Video is a great way of taking our students to interesting real-world places without leaving the classroom (and filling out a bunch of risk assessments). The rugby field, where a conversion kick is being attempted, is one such place. This workshop will share a video treatment of the "rugby kick" problem, a lovely piece of applied right-angled trigonometry and includes 'teacher edition' notes and all you need for a great lesson, or a nice little assessment task.

Target Audience: Mathematics (Years 7-10)
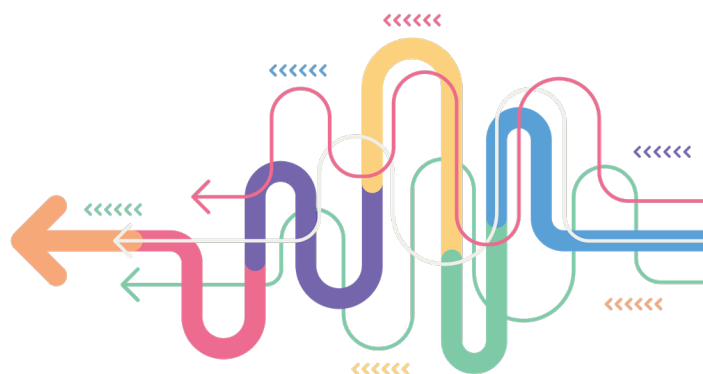
3.05 Diving into STEM: Empowering Students through project-based learning with the South Australian Curriculum for Public Education

Denise Rule and Steve Knipe, South Australian Department for Education

In this interactive workshop, we will showcase how you can bring STEM to life for middle school learners through hands-on project-based learning. Participants will explore how the developing South Australian Curriculum Science and Technologies can align with PBL, emphasising interconnected systems, design thinking, and real-world problem-solving. By working through a real-world project example, participants will gain insights into how the SA Curriculum fosters capabilities and dispositions, such as curiosity, reasoning with evidence and communicating with purpose. Science and technology teachers and leaders will leave with practical strategies for integrating the curriculum into their classrooms, supporting STEM pathways.

Target Audience: Design & Technologies (Years 7–10), Digital Technologies (Years 7–10), Mathematics (Years 7–10), Science (Years 7–10), STEM and Leaders

3.06 Oral SATs as an Alternative Assessment in Mathematics

Bethany Barker, Australian Science and Mathematics School

Are you curious about innovative approaches to maths assessment? In this workshop, we will explore how flexibility and student agency can transform Maths assessments, enabling students to authentically communicate their reasoning and conceptual understanding through oral tasks. We will consider the SACE requirements for Skills and Applications Tasks (SATs) and discover how oral SATs can satisfy these criteria while offering an engaging alternative to traditional assessment methods. Join us as we watch examples of past oral SATs, learn how to assess them effectively, and collaborate to brainstorm potential oral tasks that can be applied in your classroom.

Target Audience: Mathematics (Years 7-12)

3.07 Giving Hope Hands: How Sustainability Drives Optimism and Agency in STEM Education

Deborah Devis & Josh Ansell, Education Futures Academy- University of South Australia

Why do we care about STEM? Because STEM leads to a sustainable, healthy, and thriving world. Yet, students are feeling overwhelmed and anxious about their futures, and are unable to fully engage in STEM with agency and hope.

This presentation explores Sustainability as a Cross-curriculum priority that contextualises world problems, and STEMS role in creating a sustainable future. By investigating the often-daunting world of systems thinking, future thinking, design thinking, and challenging worldviews, we can equip students with the tools to feel like they are agents of change.

Target Audience: Design & Technologies (Years 7-12), Digital Technologies (Years 7-12), Food and Textiles (7-12), Mathematics (Years 7-12), Science (Years 7–12)

3.08 Running SACE Food Technology under DesignTechnology & Engineerings - Material Solutions Food

Hesther Van Der Leeuw, St John's Grammar School Secondary Campus

This session is designed as an information session to help those considering transitioning from SACE Food & Hospitality to Design, Technology & Engineering's - Material Solutions Food. It will cover aspects from course overview, assessment types and tasks, assignment weightings, templates and student work samples. Attendees will have the opportunity to develop perspectives around the opportunities of running Material Solutions Food as a SACE subject in their own schools and the potential advantages of doing so. Ideas such as student engagement, student-driven projects, autonomy in learning and innovative design solutions will be discussed. This presentation is designed to be engaging and collaborative with participants encouraged to ask questions and develop a professional conversation!

Target Audience: Design & Technologies (Years 11-12), Food and Textiles (7-12)

3.09 STEM Approaches Using Data Loggers

Stuart Lewis, Scientrific Pty Ltd

"STEM is a science where you think with your hands" Are you looking for ways of embedding STEM activities into the Australian Curriculum? Are you looking for a way to revive and extend your existing science equipment? This workshop will use Vernier data loggers to explore different STEM experiments. Topics will include:

*   A reimagining of the classic Egg Drop experiment to include data and tie it to the Curriculum;
*   Using Vernier probes with Arduino and Scratch;
*   A look at how to build the Microsoft robotic hand challenge;

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

SESSION 4 | 3.00pm – 4.00pm

4.01 Minecraft Madness

David Tucker, Department for Education

Discover a transformative approach to STEM education with Minecraft Education, guided by STEM Coordinator and Minecraft Accredited Educator, Mr. Tucker. This immersive program engages students in challenges that build problem-solving resilience, cooperation, and creativity. Students undertake year-long projects that link business maths and civics through historical simulations, experiencing life as colonists or convicts as they journey from the streets of England to Sydney Cove. They learn to survive, trade, and collaborate, bringing history to life. This innovative initiative has earned awards from HUB Adelaide and Flinders University, as well as opportunities to pitch in prestigious venues across Silicon Valley and the South by Southwest festival. Join us to see how this program bridges the gap between digital migrants and digital natives, transforming the classroom into a dynamic space that fosters 21st-century skills in a fun and engaging way.

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

4.02 Computational Thinking and AI – Responsible STEM in Action

Michelle McLeod, CSIRO & COSMOS Magazine

Across the world, access to digital technologies continues to transform the way we live, learn, work and communicate. Whilst digital devices and artificial intelligence (AI) have been around for decades, the exponential advancements in how devices work create ongoing change in the capability and complexity of AI available to all. There is no doubt that technology and AI have great potential to improve our world, but there is no guarantee they will do so. Ultimately it is understanding and responsible use that will determine ethical and sustainable usage. Join this session to explore newly available resources connected with computational thinking and responsible AI, including student activities, classroom presentations, teacher notes and curriculum mapping. These freely available resources use critical thinking, group work and problem-solving to enhance student knowledge, ethical understanding and problem-solving skills and support the incorporation of computational thinking and AI across STEM learning areas.

Target Audience: Digital Technologies (Years R-10), Mathematics (Years R-10), AC V9 Curriculum Connection - AI

4.03 Questacon: Connecting STEM Capacity, Culture, and Community

AJ Fairey and Lily Taylor, Questacon

Questacon is more than a science centre. For over 35 years, It has been bringing rich science, technology, and innovation experiences to students and educators around Australia. Now, through a new network of regional leaders distributed across the country, we are working to make Questacon's free STEM educator professional learning more accessible, inclusive, and relevant than ever.

Join us to enjoy an interactive introduction to Questacon's current suite of educator programs. We will share some of our favourite tools and ideas from our professional learning offerings, highlight exciting engagements coming up for South Australian educators, and discuss the aims and opportunities of the new Regional Leaders team.

Target Audience: Design & Technologies (Years R-12), Digital Technologies (Years R-12), Food and Textiles (Years R-12), Mathematics (Years R-12), Science (Years R-12)

4.04 Accessible Filmmaking and Media Arts in the K-9 Classroom

Jayne Kelly and Chloe Gardner, Capture the Action

More than ever before, students are engaging with screen content to learn, communicate and express themselves. Capture the Action (CTA) provides online interactive film and media arts courses for primary and middle school students. Our resources include a range of key creative and collaborative skills such as storytelling, planning, designing, filming, editing and group work. In this presentation, we will navigate the CTA website and reveal the engaging resources. We'll offer practical skills and knowledge so that you can feel confident about including filmmaking and media arts projects in your programs.

Target Audience: Design & Technologies (Years R-12), Digital Technologies (Years R-10)

4.05 Applying an interdisciplinary approach to immersive reality

Catherine Barnes, Annicka Adolphi and Lucy Higgins, Endeavour College

This workshop will introduce educators to the use of virtual reality and podcasting to enhance learning. Participants will explore how virtual environments can simulate real-world applications, allowing students to work together in immersive settings to solve complex problems. Podcasting will be presented as an engaging medium for students to share perspectives, and express their understanding. This approach not only supports communication skills but also encourages cross-cultural exchange and collaboration, enhancing cultural awareness.

The workshop will feature interactive sessions, during which participants will experience virtual environments in action and practice creating podcasts. Attendees will gain practical strategies for implementing these tools in classrooms and interdisciplinary contexts, with a focus on fostering positive student collaboration across diverse groups and building cultural competence.

This workshop will be held in the IMVR Lab at Endeavour College (across the road from UniSA).

Target Audience: Design & Technologies (Years 7-10), Digital Technologies (Years 7-10), Food and Textiles (7-12), Mathematics (Years 7-10), Science (Years 10-12), Integrated Learning

4.06 Astronomy, a Gateway Science into STEM

Robert Hollow, CSIRO Astronomy and Space Science

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. 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 that they can readily implement in their classrooms. Participants will need to bring a device to work on.

Target Audience: Mathematics (Years 7–10), Science (Years 7-12)

4.07 An Asteroid Redirect Test (Based on DART) - An adventure in coding, maths and science!

Sam Moyle, Australian Science and Mathematics School

Don't look up! The Earth is in trouble! An asteroid is heading towards us!

Your mission is to be a Hidden figure, forming the calculations for our DART (Sphero) to prevent Armageddon. This requires you to have a knowledge of objects in space, their relative distances, scaling, meteorite composition, velocity, mass, density and force, to determine how Deep an Impact this meteorite will have and how we can prevent this Meteor from ending life as we know it.

Ok, so pop culture references aside, this Interdisciplinary Unit run with Year 10 and 11 students at ASMS brings together the Science of Universal objects, Earth sciences, the Physics of motion and SHE, Maths in the forms of right-angled trigonometry and volume calculations of complex shapes, Digital technologies, implementing computational thinking, deconstruction and algorithm analyses through CAD simulations and basic coding and finally, English, analysing audience and purpose in the form of real vs artificial languages.

Come and experience the impetus of rich, interdisciplinary learning.

Target Audience: Digital Technologies (Years 7-10), Mathematics (Years 7-10), Science (Years 7-10), English

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

Stuart Lewis, Scientrific Pty Ltd

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

In this STEM workshop, participants will use an integrated STEM approach to design, build, 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 (VSMT). 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)

4.09 Get your hands on the next generation of handheld graphic calculator technology – a walk-through

Alastair Lupton, Adelaide Botanic High School

Just released - the next generation of Casio graphics calculators – the fx-1AU GRAPH, featuring all the same powerful functionality as the popular fx-CG50AU, accessed via an intuitive new user interface that results in less button pushing. The fx-1AU has been designed to make it even easier for students to pick up and use in your classrooms, as well as in high-stakes exams. Come along and be amongst the first to get your hands on an fx-1 (long before it starts appearing in schools) and be guided through the new interface, as well as find out more about this exciting evolution in classroom technology. With a limited number of pre-release handhelds available for this national premiere, numbers for the session will be capped, so register early!

Target Audience: Mathematics (Years 11–12)

Program correct as at 1 October 2024 but may be subject to change without notice.
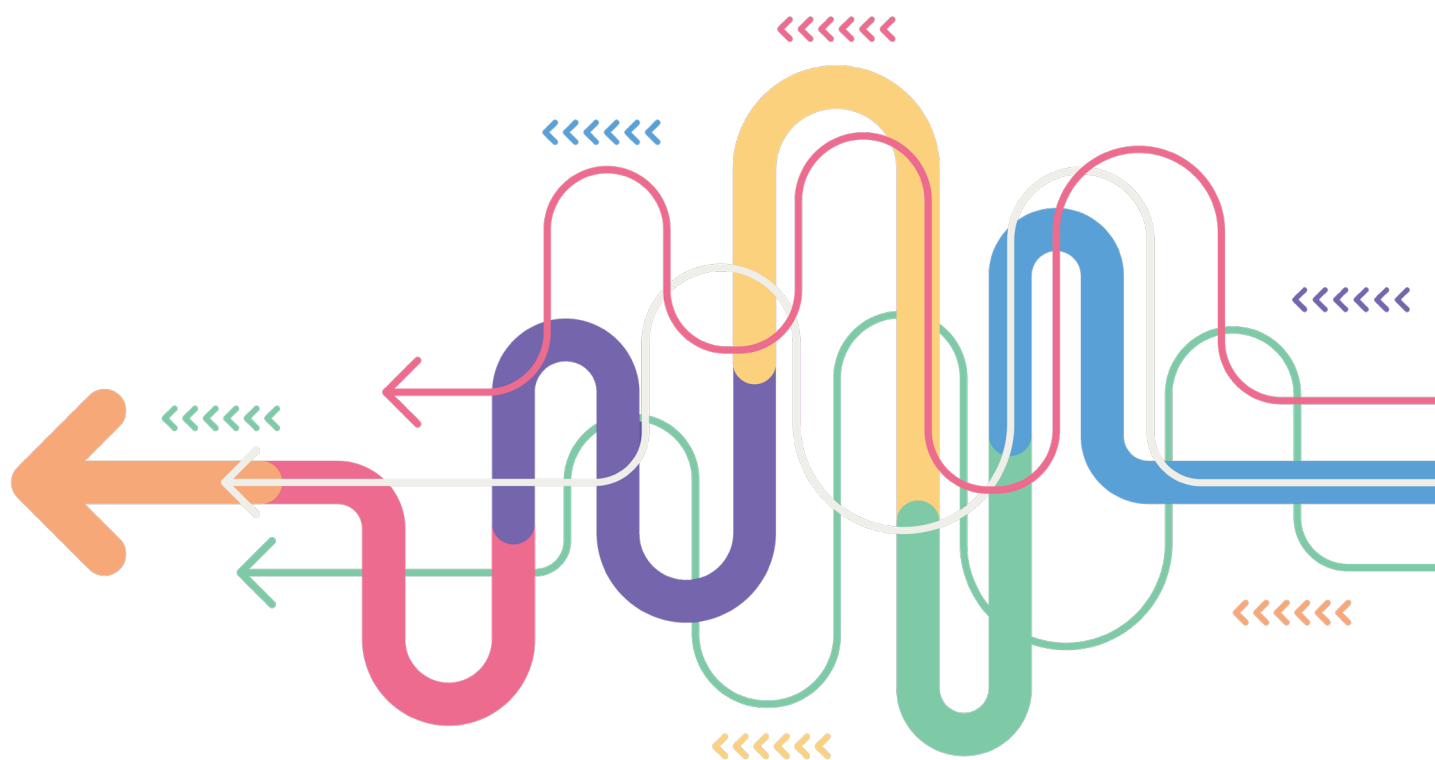
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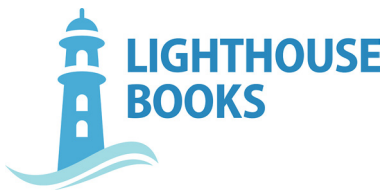
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