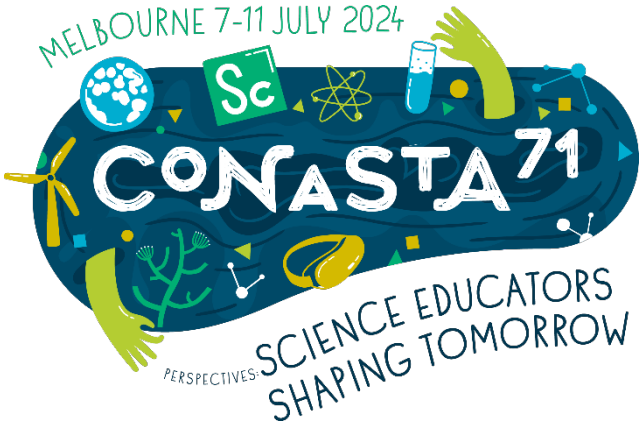

PROGRAM OUTLINE

SUNDAY 7 JULY	
4.00pm	Welcome to CONASTA 71 at Melbourne Connect

MONDAY 8 JULY	
7.00am	Science Breakfast at the State Library
8.00am	Registration | Coffee | Exhibition
9.00am	Conference Opening
9.30am	Keynote 1: Professor Pasi Sahlberg, University of Melbourne
10.30am	Morning Tea | Networking | Exhibition
11.20am	Keynote 2: Professor Michael-Shawn Fletcher, University of Melbourne
12.45pm	Stream A: Workshop Sessions
1.30pm	Lunch | Networking | Exhibition
2.55pm	Stream B: Workshop Sessions
4.00pm	ASTA Awards
4.45pm	Stanhope Oration: Professor Misty Jenkins AO, Laboratory Head, Brain Cancer Immunotherapy Lab, WEHI *Presenting Partner: Australian Academy of Science*
6.00pm	Stanhope Social Event at Woodward Centre

TUESDAY 9 JULY	
8.00am	Registration | Coffee | Exhibition
9.00am	Keynote 3: Professor Amanda Berry, RMIT University
10.10am	Morning Tea | Networking | Exhibition
11.00am	Keynote 4: Associate Professor Duane Hamacher, University of Melbourne
12.20pm	Stream C: Workshop Sessions
1.05pm	Lunch | Networking | Exhibition
2.30pm	Stream D: Workshop Sessions
3.20pm	Stream E: Workshop Sessions
7.00pm	Conference Dinner at SEA LIFE Aquarium

WEDNESDAY 10 JULY	
8.00am	Registration | Coffee | Exhibition
9.15am	ASTA Forum Panel Discussions
11.15am	Morning Tea | Networking | Exhibition
12.05pm	Stream F: Workshop Sessions & ASTA Forum Workshops
12.50pm	Lunch | Networking | Exhibition
2.25pm	Stream G: Workshop Sessions
3.20pm	Conference Close | Farewell Social

WORKSHOP OUTLINE DAY 1: MONDAY 8 JULY (STREAM A)

STREAM A WORKSHOPS: 12.45PM - 1.30PM

		Primary Audience	Theme
A1	Integrating Indigenous Knowledges in Science Education using the FIRST Framework: Opportunities in the Australian Curriculum V9.0. *Mr. Simon Collier & Mr. Max Lenoy, ACARA (Vic & Qld)*	K-12	Indigenous Perspectives
A2	Teaching science and design thinking to a Multi-Lingual Student Population. *Ms. Quyen Thai, Christ the King Catholic Primary School (Vic)*	K-6	Education for All
A3	BIG DATA biology and algorithms for ALL: let's play! *Dr. Belinda Chapman & Dr. Michelle Bull, Quantal Bioscience Pty Ltd (NSW)*	Year 9-10	Education for All
A4	Connect with STEM careers and industry using virtual reality (VR). *Ms. Nicole Fetchet, RMIT University (Vic)*	Year 9-10	Education for All
A5	The Science of Us - Measuring humans using Vernier Data Loggers. *Mr. Stuart Lewis, Scientrific (ACT)*	Year 9-10	Education for All
A6	Getting meaningful results from STEM type experiments. *Mr. Dale Carroll, Geelong College (Vic)*	Laboratory Technician	Education for All
A7	Bring the latest science news to your classroom with CSIRO Double Helix. *Mr. David Shaw, CSIRO (ACT)*	K-6	Interdisciplinary
A8	Creative and critical encounters in STEM education. *Ms. Amanda Peters, Deakin University (Vic)*	Science Education Research	Critical & Creative Thinking
A9	Plants for Space: Research helping people survive and thrive in space and on Earth. *Dr. Frazer Thorpe, La Trobe University (Vic)*	K-12	Interdisciplinary
A10	Shaping the world with STEM – Sharing how STEM shapes our world. *Ms. Michelle McLed, The Royal Institution of Australia (SA)*	Year 4-10	Interdisciplinary
A11	AI and science education. Hype or helpful? *Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)*	Year 7-8	Interdisciplinary
A12	Introducing Einsteinian Gravity in Year 7. *Mr. David Wood, University of Western Australia (WA)*	Year 7-8	Teaching Science in the Future
A13	You can't be who you can't see - incorporating real world STEM voices into your classroom. *Dr. Jennifer Payne, Curiosity Factory (Vic)*	K-6	Teaching Science in the Future
A14	Embracing the Future: Transforming Science Education for Teachers. *Ms. Vathani Amarasingham, West Virginia State University (USA)*	Year 9-10	Teaching Science in the Future
A15	The challenges in developing real-world data projects and activities in secondary science. *Ms. Helen Silvester & Ms. Jennifer Lawrence, Australian Academy of Science (Vic & NSW)*	Year 9-10	Teaching Science in the Future
A16	Exploring radiation and relativity with classroom muon detectors. *Prof. Alan Duffy, Swinburne University of Technology (Vic)*	Year 11-12	Teaching Science in the Future
A17	How Do We Inspire Our Students to Become the Scientists of Tomorrow? *Mr. Paul Wulfrun, Mount Lilydale Mercy College (Vic)*	Year 11-12	Teaching Science in the Future
A18	Introducing First Nations perspectives into your Secondary Science classroom. *Mrs. Lisa Moloney, Connecting with Country (Vic)*	Secondary	Indigenous Perspectives

A19	Energy, Sustainability and the Energy Transition. *Mr. Glen Nash, Teacher Earth Science Education Programme (Vic)*	Year 9-10	Sustainability
A20	How tiny bubbles revealed a huge problem: Analysing real ice core data. *Dr. Bridget Murphy & Mrs. Julie Mulholland, ANSTO (NSW)*	Year 11-12	Climate Education
A21	Educating Australia's Renewable Future with STELR. *Mr. Graham Stock, Australian Academy of Technological Sciences and Engineering (ACT)*	3. Year 9-10	Climate Education
A22	Curiosity as a means to promote science achievement and engagement. *Mrs. Lesley Gough, Western Sydney University (NSW)*	K-6	Critical & Creative Thinking
	Encouraging Collaboration, Creativity and Critical Thinking Skills through STEM in Primary School. *Ms. Emma Ross, The Maker Difference (Vic)*	K-6	Critical & Creative Thinking
A23	Find out how 5 minutes can change your life and the creative thinking of your students. *Ms. Sue Neale, Bayside P-12 College (Vic)*	Year 11-12	Critical & Creative Thinking
A24	Rethinking Practical Work. *Ms. Bianca Trollope & Ms. Lauren Farrugia, Freelance (Vic)*	Year 11-12	Critical & Creative Thinking

WORKSHOP OUTLINE DAY 1: MONDAY 8 JULY (STREAM B)

STREAM B WORKSHOPS: 2.55PM - 3.40PM

		Primary Audience	Theme
B1	Artificial Intelligence: Both an enemy and a friend - integrating the 'Next Big Thing' into a contemporary science classroom. *Mr. Michael Hayes, Peninsula Grammar School (Vic)*	Year 11-12	Teaching Science in the Future
B2	An ADHD teacher's guide to supporting students' needs. *Mr. Jason Harris, Inaburra School (NSW)*	Year 7-8	Education for All
B3	Building scientific knowledge. *Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)*	Year 7-8	Education for All
B4	Online Earthquake discovery. *Dr. Michelle Salmon, The Australian National University (ACT)*	Year 9-10	Education for All
B5	Physics Playground - Exploring High School Physics. *Mr. Stuart Lewis, Scientrific (ACT)*	Year 9-10	Education for All
B6	Developing a Primary STEM Program: An Inquiry and Budget-Friendly Approach. *Mrs. Brittney Downer & Ms. Michelle Meracias, Ngarri Primary School (Vic)*	K-6	Interdisciplinary
B7	Design Sprints for Future-Focussed Ideation. *Ms. Anam Javed, Victorian Academy of Teaching and Leadership (Vic)*	Year 7-8	Interdisciplinary
B8	Empowering Tomorrow's Innovators: Science Educators Shaping Futures through Communication and Sustainable Development. *Mr. Jay Chew & Ms. Farah Deeba, Al-Taqwa College (Vic)*	Year 9-10	Interdisciplinary
B9	How Can Experts' Reports Lead Astray? – Introduction of a Learning Environment Suitable for the Use in Different Focus Areas of CONASTA. *Prof. Claus Bolte, Freie Universität Berlin, Germany*	Year 9-10	Sustainability
	Examining Student Experiences in Kids' Innovation Challenge (KIC), an Integrated STEM practice at Philippine Science High School. *Ms. Mary Sheryl Saldon-Raznee, Queensland University of Technology & Philippine Science High School (Qld)*	Year 11-12	Interdisciplinary
B10	Bridging the boundaries: Developing tomorrow's innovators through interdisciplinary and transdisciplinary approaches in science education. *Miss. Stella O'Toole, Southern Cross University & Mrs. Linda Chui, MLC School Burwood (NSW)*	K-12	Interdisciplinary
B11	Hands-on digital experiments to teach students science and data. *Dr. Michael Kasumovic, University of New South Wales (NSW) & Mr. Karl Klose, Loxton Lutheran School (SA)*	K-6	Teaching Science in the Future
B12	The digital revolution and evolution of the new Primary Connections. *Ms. Helen Silvester & Ms. Jennifer Lawrence, Australian Academy of Science (Vic)*	K-6	Teaching Science in the Future
B13	Writing a great scientific research report. *Mr. Chris Bormann & Dr. Sham Nair, Department of Education (NSW)*	Year 11-12	Teaching Science in the Future
B14	Why do I need to know this (quantum edition)? *Dr. Kristen Harley & Dr. Lachlan Rogers, ARC Centre of Excellence for Engineered Quantum Systems, University of Newcastle (NSW)*	Secondary	Teaching Science in the Future
B15	Developmental Learning with Good Science. *Ms. Cristy Herron, Matilda Education (Vic)*	Year 7-8	Teaching Science in the Future
B16	Science Education. *Ms. Rosa Zwier & Ms. Emilie Nachtigall, Museums Victoria (Vic)*	Secondary	Teaching Science in the Future
B17	Gallipoli Balloon Bursters (Drip Balloons) and Trip Wire Balloon Bursters (Trip Balloons): The Ultimate STEM Challenges. *Mr. Spiro Liacos, Cheltenham Secondary College (Vic)*	Year 9-10	Critical & Creative Thinking

B18	The Art of Science or the Science of Art. *Ms. Sarah Edwards & Ms. Birra-Li Ward, Frankston High School (Vic)*	3. Year 9-10	Sustainability
B19	Enacting Climate Change Education through representing scientists' practice. *Prof. Russell Tytler & Assoc. Prof. Peta White, Deakin University (Vic)*	Science Education Research	Climate Education
B20	How Geology influences Biology and the Big 5 Extinctions. *Mr. Andy Mills, Teacher Earth Science Education Programme (Vic)*	Year 9-10	Climate Education
B21	Curiosity and Creativity in learning science. *Ms Katrina Elliott, Department for Education (SA)*	Year 7-8	Critical & Creative Thinking
B22	Modelling Amino Acid Properties Using Gel Electrophoresis. *Dr. Belinda Stumer, Craigslea State High School (Qld)*	Year 11-12	Critical & Creative Thinking
B23	Teach Skills, Not Facts. *Assoc. Prof. Melanie Trecek-King, Massasoit Community College (USA)*	Year 11-12	Critical & Creative Thinking
B24	SETA FORUM	Laboratory Technician	SETA FORUM

WORKSHOP OUTLINE DAY 2: TUESDAY 8 JULY (STREAM C)

STREAM C WORKSHOPS: 12.20PM – 1.05PM

		Primary Audience	Theme
C1	Exploring the Universe in 3D: Immersive Learning with ASTRO 3D VR. *Dr. Delese Brewster, ARC Centre of Excellence for All-Sky Astrophysics in 3D (ACT)*	Year 9-10	Teaching Science in the Future
C2	Closing the vocabulary gap in science. *Ms. Katrina Elliott, Department for Education (SA)*	Year 7-8	Education for All
C3	Inclusive representations in science teaching. *Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)*	Year 7-8	Education for All
C4	Could data save Humpty? A new approach to the classic egg drop. *Mr. Stuart Lewis, Scientrific (ACT)*	Year 9-10	Interdisciplinary
C5	Using Neuroscience to leverage retention. *Mrs. Patricia Corbin, The Lakes College (Qld)*	Year 11-12	Education for All
C6	Assessing the Effectiveness of Design Thinking Pedagogy Across NSW Stage 3 and 4 STEM Learners. *Ms. Georgia McCarthy & Ms. Maryam Kausar, University of Technology Sydney (NSW)*	Science Education Research	Education for All
C7	Integrating maths and science learning: Planning, doing and lessons learned. *Dr. Joseph Ferguson & Prof. Amanda Berry, RMIT University (Vic)*	K-6	Interdisciplinary
C8	Recognising our past, imagining our future: writing the histories of science teacher associations of Australia. *Dr. Rod Fawns & Mr. Robert Roe, Science Teachers Association of Victoria, and Ms. Ruth Dircks, Australian Science Teachers Association (Vic & ACT)*	All	Interdisciplinary
C9	An approach to science inquiry assessment. *Assoc. Prof. Peta White & Prof. Russell Tytler, Deakin University (Vic)*	K-6	Teaching Science in the Future
C10	Powerful Problem-Solving in Science. *Dr. David Hosken, Scitech (WA)*	K-6	Teaching Science in the Future
C11	Gamification: Fad or Future. *Miss. Stella Ding, The Ponds High School (NSW)*	Year 7-8	Teaching Science in the Future
C12	Teaching Interactive Science Inquiries through the creation of Virtual Reality. *Dr. Paul Unsworth, University of South Australia & Mrs. Rosanna Cotino, EdgedVR (SA & NSW)*	Year 9-10	Teaching Science in the Future
C13	Scaling effective teaching strategies in Science Extension – sharing and learning from the experiences of NSW teachers and students. *Mr. Chris Bormann, Department of Education (NSW)*	Year 11-12	Teaching Science in the Future
C14	Awe and Wonder: Astronomy as a Gateway? *Dr. Saeed Salimpour, Deakin University (Vic)*	Science Education Research	Teaching Science in the Future
C15	Utilizing Artificial Intelligence and Interactive Media to Enhance Chemistry Education: A Case Study from RMIT Foundation Studies. *Dr. Sawsan Freij & Mrs. Joanne Bradley, RMIT University (Vic)*	Foundation year	Teaching Science in the Future
C16	Understanding chemical hazard information. *Dr. Phillip Crisp & Ms. Eva Crisp, Ecosolve Australia (NSW)*	K-12	Teaching Science in the Future
C17	Full STEAM ahead! *Mrs. Lisa Moloney, Connecting with Country (Vic)*	Secondary	Indigenous Perspectives
C18	'The Science Within Us', a digital resource exploring our genetic identity. *Ms. Arena Nilsson, Genetic Support Network of Victoria (Vic)*	Year 7-8	Sustainability
C19	Nanoaquaria for ecological investigation. *Mr. Brian Stumer, Craigslea State High School (Qld)*	Year 9-10	Sustainability
C20	Climate Science: A Perfect Introduction. *Mr. Spiro Liacos, Cheltenham Secondary College (Vic)*	Year 9-10	Climate Education
C21	Citric Acid: Unveiling its Versatility - A Hands-On Science Workshop! *Mr. Jacob Strickling, Australian Christian College (NSW)*	Year 7-8	Sustainability

C22	Evidence-based argumentation - a collaborative approach. *Mr. Patrick Griffin, Centenary State High School (Qld)*	Year 7-8	Critical & Creative Thinking
C23	Innovative physics equipment designed in Australia. *Mr. Peter Mansell, Haines Educational (Vic)*	Year 11-12	Critical & Creative Thinking
C24	Using Problem Based-Learning in the Science classroom. *Miss. Caroline Cotton, BioBrain (Vic)*	Year 11-12	Critical & Creative Thinking
C25	Primary Science student enactment of Impactful Inquiry that 'makes a difference'. *Mrs. Melinda Kirk & Dr. Joseph Ferguson, Deakin University (Vic)*	K-6	Critical & Creative Thinking

WORKSHOP OUTLINE DAY 2: TUESDAY 8 JULY (STREAM D)

STREAM D WORKSHOPS: 2.30PM - 3.15PM

		Primary Audience	Theme
D1	Exploring Resources for Integrating Cultural Knowledge in the Chemistry Classroom. *Dr. Emily Rochette, University of Melbourne (Vic)*	Year 9-12	Indigenous Perspectives
D2	Clues from the brain of an Autistic ADHDer explain how to engage ALL your students when teaching STEM. *Dr. Lorien Parker, Scienceplay Kids (Vic)*	K-6	Education for All
D3	Connecting the Dots: Integrating STEM Across Disciplines. *Mrs. Claire Hughes, University of Adelaide (SA)*	Year 7-8	Interdisciplinary
D4	Awesome hands-on demonstrations: a cross-curricular Earth science perspective on STEM teaching. *Mr. Joe Fayle, Geoscience Australia (ACT)*	Secondary	Interdisciplinary
D5	Capturing the Cosmos: Astronomy as a gateway for interdisciplinary teaching and learning. *Dr. Michael Fitzgerald & Dr. Saeed Salimpour, Deakin University (Vic)*	Year 9-10	Interdisciplinary
D6	Using the LIA (Launch, Inquire, Act) Framework to provide depth in science and STEM inquiry. *Ms. Helen Silvester, Australian Academy of Science & Prof. Russell Tytler, Deakin University (Vic)*	Year 7-8	Teaching Science in the Future
D7	Day 1 in a self-paced, mastery-based classroom: A student's perspective. *Mrs. Rachel Peach, Inaburra School (NSW)*	Year 9-10	Teaching Science in the Future
D8	Astronomy as a Context for Data Science with your Students. *Mr. Robert Hollow, CSIRO Space and Astronomy (NSW)*	K-12	Teaching Science in the Future
D9	Experience the Modern STEM Classroom through Gamifying Earth Science. *Ms. Suzy Urbaniak OAM & Mr. Jett Coletti, CoRE Learning Foundation (WA)*	Year 4-12	Teaching Science in the Future
D10	Constructing meaning using assessments to promote learning in science. *Dr. Sham Nair, Department of Education (NSW)*	Year 11-12	Critical & Creative Thinking
D11	Questacon's Cyber Team Red: Using tabletop gameplay to explore cyber security careers and skills. *Mr. Lachlan Agett, Questacon (ACT)*	Year 9-10	Critical & Creative Thinking
D12	Shaping Tomorrow's Scientists: Uncovering the Unseen with Australian Ingenuity. *Ms. Jackie Bondell, University of Melbourne (Vic)*	Year 7-8	Critical & Creative Thinking
D13	Flights of Fancy: Critical and Creative Thinking in Aerodynamics Education. *Dr. Graham Wild, University of NSW (NSW)*	All	Critical & Creative Thinking
D14	Cultivating a Questioning Classroom. *Dr. Charlotte Pezaro & Dr. Natalie McKirdy, Dialogic Education Services (Qld)*	K-10	Critical & Creative Thinking
D15	Engaging Science with Origami models - Interactive Rat Dissection! *Mrs. Daniela Migliorati, Science Supply Australia & Mrs. Marcia Rogerson, CREST Education (Vic)*	Laboratory Technician	Sustainability
D16	Fighting the Bee Bug. *Mrs. Nicolette Wheaton, The Glennie School (Qld)*	Year 7-8	Critical & Creative Thinking
D17	Questacon's Cyber Castle Challenge: Using Minecraft Education to teach digital technologies. *Mr. Jeremy Ram, Questacon (ACT)*	K-6	Interdisciplinary
D18	Climate aware, not climate afraid. *Ms. Elke Barczak & Ms. Priscilla Gaff, Museums Victoria (Vic)*	Year 7-8	Climate Education
D19	Riding the Climate Rollercoaster. *Mr. Glen Nash, Teacher Earth Science Education Programme (Vic)*	Year 9-10	Climate Education

D20	Using food science to stimulate student engagement in the Qld applied sciences. *Mrs. Valma Cahill & Mr. Fletcher Christian, Harristown State High School (Qld)*	Year 11-12	Teaching Science in the Future
D21	Capturing Curiosity in the Primary Science Classroom. *Ms. Angela White, Eltham Primary School (Vic)*	K-6	Teaching Science in the Future
D22	My favourite classroom demonstrations. *Mr. Mick Moylan, University of Melbourne (Vic)*	Year 9-10	Teaching Science in the Future
D23	Astronomy Activities That Will Blow Your Students' Minds. *Mr. Spiro Liacos, Cheltenham Secondary College (Vic)*	Year 7-8	Teaching Science in the Future
D24	Developing metacognition through scientific investigations. *Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)*	Year 7-8	Critical & Creative Thinking
D25	Empowering Tomorrow: Recognizing the Crucial Role of School Science Technicians in Science Education. *Ms. Jasmina Hazrolaj, Wenona School (NSW)*	Laboratory Technician	Teaching Science in the Future

WORKSHOP OUTLINE DAY 2: TUESDAY 8 JULY (STREAM E)

PA STREAM E WORKSHOPS: 3.20PM – 4.05PM

		Primary Audience	Theme
E1	D1 Continued		
E2	D2 Continued		
E3	D3 Continued		
E4	D4 Continued		
E5	D5 Continued		
E6	D6 Continued		
E7	D7 Continued		
E8	D8 Continued		
E9	D9 Continued		
E10	D10 Continued		
E11	D11 Continued		
E12	D12 Continued		
E13	D13 Continued		
E14	D14 Continued		
E15	D15 Continued		
E16	D16 Continued		
E17	Empowering Educators: Tools for Inclusive Science Teaching and Learning. *Ms. Dimple Bhardwaj & Ms. Lorena Pellone-Gismondi, Victorian Academy of Teaching and Leadership (Vic)*	Year 7-8	Teaching Science in the Future
E18	Fuel cells in the Junior and Senior Science Curriculum. *Miss. Jelena Edhouse, Oakey State High School (Qld)*	Year 9-10	Sustainability
E19	Bringing harmony into Science and Physics through First Nations Perspectives. *Mrs. Lisa Moloney, Connecting with Country (Vic)*	Secondary	Indigenous Perspectives
E20	Utilizing an 'industrial case study' for chemistry education within the context of 'soap' and related industries. *Dr. Mohammad Chowdhury, St. Francis Xavier College (Vic)*	Science Education Research	Teaching Science in the Future
E21	Harnessing the Power of Technology in the Science Classroom. *Mrs. Kelly Hollis & Mr. John Davison, Education Perfect (NSW & Vic)*	Year 7-8	Teaching Science in the Future
E22	How to best organise and manage student-designed investigations. *Mr. James Crisp, RiskAssess & Mr Philip Crisp, Ecosolve (NSW)*	Secondary	Education for All
E23	Demonstration Derby 1		

DERBY 1 (STREAM

E23	Adopting ocean literacy into the classroom to enable a sustainable world. *Dr. Prue Francis & Dr. Cátia Freitas, Deakin University (Vic)*	K-6	Sustainability
	Re-engaging high school girls in STEM. *Mr. Christopher Brunner, Sydney Secondary College – Balmain Campus (NSW)*	Year 9-10	Education for All

	Introducing First Nations perspectives into your Primary Science classroom. *Mrs. Lisa Moloney, Connecting with Country (Vic)*	K-12	Indigenous Perspectives
	Diversity in STEM Collective - Engaging with Universities across Australia. *Miss Tara Graves, RMIT University (Vic) & Miss Tayla Allison, University of Adelaide (SA)*	K-12	Education for All
	PhysChemTechTrainer as a learning aid for Senior Secondary Physics. *Mr. Tino Delbourgo, Don College (Tas)*	Year 11-12	Teaching Science in the Future

WORKSHOP OUTLINE DAY 3: WEDNESDAY 10 JULY (STREAM F & ASTA WORKSHOPS)

			Primary Audience	Theme
STREAM F / ASTA WORKSHOPS: 12.05PM - 12.50PM	F1	ASTA Workshop: What are the key purposes of science education?	All	ASTA Forum
	F2	ASTA Workshop: What image of “science” should we promote?	All	ASTA Forum
	F3	ASTA Workshop: What ethics and values should be promoted in school science?	All	ASTA Forum
	F4	ASTA Workshop: How can critical thinking about science in society be promoted?	All	ASTA Forum
	F5	ASTA Workshop: How can we ensure equity in science education?	All	ASTA Forum
	F6	ASTA Workshop: How can school science develop futures thinking?	All	ASTA Forum
	F7	ASTA Workshop: What are the key challenges for science education in the 21st century?	All	ASTA Forum

WORKSHOP OUTLINE DAY 3: WEDNESDAY 10 JULY (STREAM G)

STREAM G WORKSHOPS: 2.25PM - 3.10PM

		Primary Audience	Theme
G1	Magic and hydraulic dinosaurs. *Mr. Peter Razos, Caufield Grammar (Vic)*	Year 7-8	Education for All
G2	A Healthy Land – Measuring the environment with Vernier dataloggers. *Mr. Stuart Lewis, Scientrific (ACT)*	Year 9-10	Education for All
G3	Shaping School STEM Diversity with University Support. *Ms. Maryam Kausar, University of Technology Sydney (NSW) & Ms. Tara Graves, RMIT University (Vic)*	K-12	Education for All
G4	Seamlessly incorporating STEM activities into your classroom practice. *Dr. Lucy Cassar, St Francis Catholic College (Vic) & Ms. Catherine Bellair, Thomas Carr College (Vic)*	Year 7-8	Interdisciplinary
G5	Teaching bioethics in senior biology using guided inquiry: A study with teachers as co-researchers. *Mrs. Amrita Kamath, Deakin University (Vic)*	Year 11-12	Teaching Science in the Future
G6	Understanding and applying collaborative AI into the classroom: Moving from FEAR to FOMO (Fear of Missing Out). *Mr. Raj Burli, CSIRO (Vic)*	K-12	Interdisciplinary
G7	Science at work in civil engineering and construction. *Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)*	Year 7-8	Interdisciplinary
G8	The Story of Mungo Man 50 years on. *Mrs. Lisa Moloney, Connecting with Country (Vic)*	K-12	Indigenous Perspectives
G9	How to best organise and manage student-designed investigations. *Mr. James Crisp, RiskAssess & Dr. Phillip Crisp, Ecosolve (NSW)*	Laboratory Technician	Education for All
G10	Australia's first Forest Science Explorers teacher toolkit – A Virtual Field Experience (VFE). *Ms. Beth Welden & Ms. Kaz Standish, Forest and Wood Products Australia (Qld)*	K-6	Sustainability
G11	Chemistry of Critical Minerals – Sustainable, Climate-safe Energy. *Mr. Glen Nash, Teacher Earth Science Education Programme (Vic)*	Year 9-10	Sustainability
G12	Climate Change Education Forum- hearing from secondary school students on the future of climate change education. *Ms. Ellie Hansford, Sustainability Victoria (Vic)*	Science Education Research	Climate Education
G13	Using data and numeracy skills in the classroom. *Mr. Wayne Sandlant, Somerville Secondary College (Vic)*	Year 9-10	Interdisciplinary
G14	Score Big with STEM. *Miss. Sophie Stewart & Mrs. Emily O'Halloran, The Huddle (Vic)*	K-6	Critical & Creative Thinking
G15	Shaping the Innovators of the Future. *Ms. Libby Moore, Moore Educational (Vic)*	K-6	Critical & Creative Thinking
G16	Electricity: The Shocking Truth. *Mr. Spiro Liacos, Cheltenham Secondary College (Vic)*	Year 9-10	Critical & Creative Thinking
G17	A representation construction pedagogy that transcends the inquiry-explicit teaching binary. *Prof. Russell Tytler & Prof. Vaughan Prain, Deakin University (Vic)*	Science Education Research	Critical & Creative Thinking
G18	Conservation science in schools. *Mr. Christopher Vella, Zoos Victoria (Vic)*	K-12	Interdisciplinary
G19	Big Data in Science – Creating a Year 10 Elective Class. *Mr. David Henry, St. Mary MacKillop College (ACT)*	Year 9-10	Critical & Creative Thinking

G20	Designing lesson plans for interdisciplinary citizen science in schools: bridging biodiversity and public health. *Dr Larissa Braz Sousa, University of Sydney (NSW)*		Teaching Science in the Future
G21	Demonstration Derby 2		

DERBY 2 (STREAM G)

		Primary Audience	Theme
G23	The Plant Science Learning Hub - innovation and outreach on a national level at the Australian National Botanic Gardens. *Mrs. Sally Ingham, Australian National Botanic Gardens (ACT)*	K-6	Education for All
	Analysing student and class interests for improved differentiation. *Dr. Christopher Brunner, Sydney Secondary College – Balmain Campus (NSW)*	Year 7-8	Education for All
	Using data and numeracy skills in the classroom. *Mr. Wayne Sandlant, Somerville Secondary College (Vic)*	Year 9-10	Interdisciplinary
	Fostering Innovation in Wildlife Conservation. *Miss Francesca Lennie, Zoos Victoria (Vic)*	K-12	Teaching Science in the Future
	Sharing student research – The Journal of Science Extension Research. *Mr. Chris Bormann, Department of Education (NSW)*	Year 11-12	Teaching Science in the Future
	Bringing life to Evidence-based teaching when preparing students for Internal Assessments. *Dr. Meriet Mikhail, Anglican Church Grammar School (Qld)*	Year 11-12	Teaching Science in the Future

WORKSHOP ABSTRACTS (STREAM A)
MONDAY 8 JULY

A1

Integrating Indigenous Knowledges in Science Education using the FIRST Framework: Opportunities in the Australian Curriculum V9.0

Mr. Simon Collier & Mr. Max Lenoy, ACARA (Vic & Qld)

In the evolving landscape of Australian education, the Australian Curriculum V9.0 offers an integrated approach to science teaching, delineating clear strands of scientific inquiry, human endeavour and understanding while weaving in the cross-curriculum priority of Aboriginal and Torres Strait Islander Histories and Cultures. Incorporating these knowledges into science education opens significant opportunities for enhancing cultural understanding and relevance in scientific study. The presentation will explore practical strategies for educators to effectively merge these strands, creating an enriched, inclusive, and comprehensive science learning environment using the ACARA FIRST Framework. Emphasising the importance of Indigenous knowledge systems and their contributions to contemporary science, the goal is to equip educators with the tools to foster a deeper appreciation for the knowledge diversity in scientific exploration. Join us in shaping a future where science education is both inclusive and reflective.

Theme: Indigenous Perspectives

Primary Audience: K-12

A2

Teaching science and design thinking to a Multi-Lingual Student Population

Ms. Quyen Thai, Christ the King Catholic Primary School (Vic)

The percentage of EAL students in specific areas of Australia is increasing. This means that educators need to improve their teaching and learning methods to meet this demographic. This presentation will discuss how vocabulary learning, when delivered with integrity, allows for the deep and effective learning of STEM concepts. Another component of effective learning of STEM for EAL students is the integration of STEM subjects within other core subjects such as Literacy and Numeracy. How Christ the King Catholic Primary School approached this will be demonstrated.

Theme: Education for All

Primary Audience: K-6

A3

BIG DATA biology and algorithms for ALL: let's play!

Dr. Belinda Chapman & Dr. Michelle Bull, Quantal Bioscience Pty Ltd (NSW)

Are you a high school teacher looking into the future with some trepidation, as data science moves into the curriculum? Are you ready to embrace data science for your students, but worried about resources, and not sure where to start? Ever wondered how you could teach your students about machine learning, when you don't even have any machines? Are you struggling to find accessible and engaging datasets for your students for secondary investigations and depth studies? If you answered yes to any or all of these questions, join us to shake out some of those concerns, and get set for some fun! We've developed a simple boardgame resource to help you introduce your students to the applications of big data in biology and get hands-on with designing algorithms to answer research questions using biological databases…and you don't even need a computer in your classroom! Come play data science with us!

Theme: Education for All

Primary Audience: Year 9-10

A4

Connect with STEM careers and industry using virtual reality (VR)

Ms. Nicole Fetchet, RMIT University (Vic)

The workforce is changing and so are our education methods. Gaining a bachelor's degree isn't the only option for the next generation to succeed- but what are the other options? RMIT will help you to understand the STEM education pathways available to your students of all levels- from Vocational Education (TAFE) and trades through to Higher Education. RMIT have been bringing to life inaccessible construction sites, refrigeration facilities, supermarkets and sustainable building practice through virtual reality (VR). Join this workshop to experience firsthand how this VR is connecting real-world industry to our school classrooms and the careers of the future.

Theme: Education for All

Primary Audience: Year 9-10

A5

The Science of Us - Measuring humans using Vernier Data Loggers

Mr. Stuart Lewis, Scientrific (ACT)

Humans are not simple. We are a series of complex systems streamed through a conscious brain. This means that there is a lot that can be measured, from bioelectric impulses required to move muscles to an analysis of touch.

This workshop will use Vernier datalogging equipment to explore topics such as:

- EKG and heart analysis
- Muscle analysis and strength
- Wavelengths of light that fool the eye
- How to tell if a room is well ventilated
- Which feels warmer? tactile illusions
- How much dye is in foods?

Theme: Education for All

Primary Audience: Year 9-10

A6

Getting meaningful results from STEM type experiments

Mr. Dale Carroll, Geelong College (Vic)

This session will explore some STEM/Investigative type practicals and how to safely get meaningful results. We will look at some examples of practicals from year 9/10 and Y12. It is a good learning experience for some students to experience not getting meaningful results from their experiment, however there will be others that get frustrated. Having a base where they get some results and then others can go above and beyond to explore their interests.

There is no right or wrong way of doing these so please bring along your ideas to share.

Theme: Education for All

Primary Audience: Laboratory Technicians

A7

Bring the latest science news to your classroom with CSIRO Double Helix

Mr. David Shaw, CSIRO (ACT)

CSIRO Double Helix has resources perfect for bringing the latest news to your science, technology, and maths classes. Attend this session to receive a free copy of Double Helix magazine, plus teacher notes on using Double Helix resources. Your students will have access to interviews with top Australian scientists involved in current research, with plenty of inspiring and diverse voices featured in these resources. Plus, there's a range of content types for developing literacy, including hands-on activities, puzzles, comics and sci-fi. Find out what's currently available (free and paid resources) and learn how to easily match the Double Helix content to

your lesson plans. Then have your say on the development of future resources, so CSIRO Double Helix can tailor them to be perfect for teachers like you!
Theme: Interdisciplinary
Primary Audience: K-6

A8

Creative and critical encounters in STEM education.
Ms. Amanda Peters, Deakin University (Vic)
Schools are tasked with implementation of STEM education, informed by state policy. The policy, in a Victorian context, is nearing the end of a ten-year plan. However, student enrolments and performance in STEM subjects remain in decline. To explore this issue, I critically analysed the policy using an approach to disrupt assumptions. To understand if the policy is realised in practice, I used arts-based research to explore experiences of STEM education stakeholders. The data was analysed, recognising silences and power relations. The findings are presented in a letter to STEM, with STEM writing in reply. I position myself as a researcher, teacher, student, and leader to illuminate new ways of seeing policy and practice for potential transformation in STEM education. The methodologies used in the research may be applied in the classroom to uncover and disrupt taken for granted assumptions, creatively and critically think when exploring issues in science.
Theme: Critical & Creative Thinking
Primary Audience: Science Education Research

A9

Plants for Space: Research helping people survive and thrive in space and on Earth.
Dr. Frazer Thorpe, La Trobe University (Vic)
ARC Centre for Excellence in Plants for Space (P4S) is an Australian led research and education centre that combines Universities, Industries and Space Agencies. P4S is exploring ways to re-design plants to produce nutritious foods, materials and medicines that enable humans to thrive in Space and enhance Earth sustainability. P4S's learning experiences use P4S transdisciplinary research to navigate and enrich curricula and spotlight STEM careers. We discuss how P4S offers fertile ground for critical thinking about Plants, Technology, Humans, Sustainability, and their intersections. Teacher will develop understanding about the challenges and research to enable plants to grow off-Earth, and how this research can solve sustainability and agriculture issues on Earth. Missions include: Zero waste plants, On-demand medicines, and Complete nutrition foods. We will share examples of approaches and resources teachers can access and use in their classrooms such as student projects, P4S explainers, and career pathways, and immersive learning opportunities.
Theme: Interdisciplinary
Primary Audience: K-12

A10

Shaping the world with STEM – Sharing how STEM shapes our world.
Ms. Michelle McLed, The Royal Institution of Australia (SA)
Interested in enhancing your science teaching strategies and connecting your classroom and learning activities with emerging STEM research? Looking to utilise resources and activities that incorporate STEM in Action examples? Come along to learn about the FREE Australian Curriculum connected resources available through The Royal Institution of Australia's (RiAus) STEM Education Platform. With exclusive access to content from Cosmos Magazine and a range of partnerships including the Australian Antarctic Division, the SCINEMA Film Festival and the Minderoo Flourishing Oceans project we aim to share the future of science with everyone. Our resources provide learning activities connected with science as a human endeavour and

cross-curricular priorities, showcasing indigenous perspectives and sustainability, and assist teachers to incorporate hands-on activities, develop critical and creative thinking and conceptualise links between research and curriculum. Join this session to explore available resources and activities, suggest new ideas, explore research examples, and network with colleagues.
Theme: Interdisciplinary
Primary Audience: Year 4-10

A11

AI and science education. Hype or helpful?
Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)
There has been plenty of buzz around AI transforming practice - this workshop will go beyond the hype to unpack: the basics of what you 'need' to know about AI to be an informed and effective user; ideas and examples for how science teachers can use AI in practice; and key pitfalls to avoid ensuring your AI use is effective and ethical.
Theme: Interdisciplinary
Primary Audience: Year 7-8

A12

Introducing Einsteinian Gravity in Year 7
Mr. David Wood, University of Western Australia (WA)
Participants will acquire the teacher background and resources needed to introduce students to our modern understanding of gravity. Topics covered include: the measurement and nature of space, time, and gravity as curved space. We will analyse freely falling bodies and use the spacetime simulator to measure spacetime warp, investigate force between masses and explore light bending as it passes massive objects. These ideas are developed to explain the orbit of objects in the Solar System and to introduce black holes and gravity waves. The session will finish with a brief explanation about how your school access resources and support.
Theme: Teaching Science in the Future
Primary Audience: Year 7-8

A13

You can't be who you can't see - incorporating real world STEM voices into your classroom.
Dr. Jennifer Payne, Curiosity Factory (Vic)
Learning about diversity in STEM is important for students to see themselves pursuing a STEM career or engaging with STEM material. While not all students want to pursue STEM careers, future job tasks will require these skills, making it vital to emphasise their importance. By showcasing the variety of STEM professionals and their stories we can help students understand how their learning can translate to real-world STEM, job opportunities, understanding the world around them, and a growth mindset. The workshop will use a student-centred hands-on approach to demonstrate the importance of sharing and engaging with diverse STEM stories and incorporating real-world STEM into your classrooms. Participants will explore their own and student STEM biases and receive resources to integrate real-world STEM into their classroom.
Theme: Teaching Science in the Future
Primary Audience: K-6

A14

Embracing the Future: Transforming Science Education for Teachers
Ms. Vathani Amarasingham, West Virginia State University (USA)

This presentation explores the future of science education, highlighting innovative approaches, emerging technologies, and learning strategies. It explores the integration of experiential learning, interdisciplinary connections, and digital tools to enhance student engagement and learning outcomes with special emphasis on Project Based Instruction. Additionally, it addresses the importance of fostering critical thinking, creativity, and collaboration skills in preparing students for the challenges of tomorrow's world. The presentation will also discuss how educators can adapt to these changes, providing practical insights and resources to support their professional development. By embracing these advancements, teachers can enhance their teaching effectiveness and empower students to become lifelong learners and critical thinkers.
Theme: Teaching Science in the Future
Primary Audience: Year 9-10

A15

The challenges in developing real-world data projects and activities in secondary science.
Ms. Helen Silvester & Ms. Jennifer Lawrence, Australian Academy of Science (Vic & NSW)
The collection of data is more prevalent now than ever before. But how can teachers access this data, assess its appropriateness, and use it to support student learning in real-world contexts? Australian Academy of Science Education is working to develop resources to support teachers to do just this. Join us for a fireside chat to discuss the resource needs of you and your students. Provide feedback and shape the approach being developed and be the first to see the upcoming offerings.
Theme: Teaching Science in the Future
Primary Audience: Year 9-10

A16

Exploring radiation and relativity with classroom muon detectors
Prof. Alan Duffy, Swinburne University of Technology (Vic)
Advanced physics concepts such as relativity, as well as the properties of radiation from absorption to Poisson statistics, are challenging concepts to teach, much less allow, students to experiment with in the classroom. Thanks to naturally occurring high-energy particles from space, known as muons, we can explore a range of advanced concepts with little equipment in the lab. Swinburne has trialled a new Australian-made classroom muon detector in its physics labs, and this talk will demonstrate how these can be used in high schools to make the exploration of the highest energy universe accessible for all.
Theme: Teaching Science in the Future
Primary Audience: Year 11-12

A17

How Do We Inspire Our Students to Become the Scientists of Tomorrow?
Mr. Paul Wulfrun, Mount Lilydale Mercy College (Vic)
With the increased interest into space science and the power of science communicators over a range of industries. We ask the question; how do we equip students for these new industry opportunities? Can they work within the current frameworks of curriculum, and do we have the resources to offer an engaging and adaptive curriculum that have relevant real-world applications?
Theme: Teaching Science in the Future
Primary Audience: Year 11-12

A18

Introducing First Nations perspectives into your Secondary Science classroom

Mrs. Lisa Moloney, Connecting with Country (Vic)
NAIDOC Week is from the 7th to the 14th of July. This year's theme "Keep the Fire Burning. Blak, Loud and Proud" invites us to showcase and celebrate the contributions of First Nations Peoples, their culture, and knowledges. By making space in our science classrooms for First Nations perspectives, voice, and knowledges we can start to decolonise our curriculum one lesson at a time. This session will be a deeper dive into activities and resources for including First Nations perspectives from the 15min taster.
Theme: Indigenous Perspectives
Primary Audience: Secondary

A19

Energy, Sustainability, and the Energy Transition
Mr. Glen Nash, Teacher Earth Science Education Programme (Vic)
Energy has a transformational impact on the quality of human life. It impacts every facet of what we do and how we live making energy one of the most important issues of our time. We require nothing short of a complete transformation of how we produce, transport, and consume energy, for a sustainable future. However, energy, the environment and the economy are intimately linked and the four pillars of energy security i.e., affordability, availability, reliability, and sustainability must be maintained. Australia, like many countries globally, is committed to achieving Net Zero by 2050, by reducing global energy related GHG emissions to net zero by 2050. TESEP's Energy Transition workshops and webinars examine elements of energy generation (comparing and contrasting non-renewable and renewable techniques) and storage (including hydrogen, pumped hydro and battery technology), transmission and distribution. With a focus on Australia, the workshops and webinars examine Australia's response, and discusses the challenges and opportunities our Net Zero commitment brings – including the need for critical and other minerals for renewable energy and our safeguarding of the Earth's climate. The topic covers a wide range of the curriculum, particularly Stage 5 to senior secondary with chemistry, physics, and STEM crossover.
Theme: Sustainability
Primary Audience: Year 9-10

A20

How tiny bubbles revealed a huge problem: Analysing real ice core data.
Dr. Bridget Murphy & Mrs. Julie Mulholland, ANSTO (NSW)
Data analysis is an important part of scientific investigations! This workshop investigates how teachers can build student confidence and capabilities in data analysis by exploring one of our data set resources. ANSTO scientists use naturally occurring radioisotopes to monitor changes in the environment over long time scales. As one example of this research, Dr Andrew Smith uses ice cores from the Antarctic to determine changes in temperature and atmospheric greenhouse gas concentrations. In this workshop, teachers will investigate this ANSTO resource, which enables students to examine authentic scientific data showing 800,000 years of greenhouse gas concentrations. We will explore ways students can analyse the data to arrive at the same conclusions as the scientists. This resource addresses Science Inquiry Skills such as processing and analysing data, problem solving and communicating, as well as ICT skills and critical and creative thinking. Teachers can also use this resource to cover Science Understanding content in Chemistry, Biology and Earth and Environmental Science.
Theme: Climate Education
Primary Audience: Year 11-12

A21

Educating Australia's Renewable Future with STELR
Mr. Graham Stock, Australian Academy of Technological Sciences and Engineering (ACT)
n this workshop, learn how to boost STEM learning in your classroom with STELR, a suite of resources available from the Academy of Technological Sciences and Engineering focused on renewable energy, with kits relating to wind and solar energy generation, as well as solar powered electric vehicles and sustainable house design. This workshop is suitable for secondary teachers, from all levels of experience in science education.
Theme: Climate Education
Primary Audience: Year 9-10

A22 (shared)

Curiosity as a means to promote science achievement and engagement.
Mrs. Lesley Gough, Western Sydney University (NSW)
Scientific discovery has historically been fuelled by curiosity. This session will explore the promotion of curiosity in primary school and early childhood centres as a means to enhance science engagement and achievement. Through the development of students' thinking skills and their use of the scientific method, curiosity is something that can be nurtured. This session will present tried and tested ways to stimulate student curiosity as well as methods to harness this curiosity to develop science programs for individual contexts. Delegates will learn that science is present in everyday life and walk away from the talk with the understanding that we do not need specialist equipment to conduct experiments and investigations. Delegates will also leave the session with some 'ready to go' curiosity science learning experiences that will enhance students' critical and creative thinking and foster a love of scientific discovery.
Theme: Critical & Creative Thinking
Primary Audience: K-6

A22 (shared)

Encouraging Collaboration, Creativity and Critical Thinking Skills through STEM in Primary School
Ms. Emma Ross, The Maker Difference (Vic)
Rapid technological change has created an ever-changing workforce where more increasing importance is being placed on the ability to think creatively and strategically problem solve. Makerspaces and other STEM Learning Ecologies are making a significant impact on the educational landscape around the world as schools rethink traditional classrooms and pedagogies to better address this skills gap and prepare students for a successful future. Informed by the presenter's recent Exploratory Case Study: ‘How Makerspaces Encourage Deep Learning in Young Children’, this presentation discusses the connection between a STEM program and the acquisition of creativity, collaboration, and critical thinking, while making clear connections to science curriculum. Patterns and themes emerged from the research findings, leading to the identification of key enablers and the development of a Makerspace Pedagogical Framework. Detailed vignettes are shared as exemplars for teachers, who will benefit from taking away practical strategies and ideas for implementation in their classrooms.
Theme: Critical & Creative Thinking
Primary Audience: K-6

A23

Find out how 5 minutes can change your life and the creative thinking of your students.
Ms. Sue Neale, Bayside P-12 College (Vic)
Knowing your science is one thing but being able to understand and apply to new situations is the true essence of education. As educators we often find it difficult to develop, monitor and see improvements in our students' ability to think creatively. Through the 5-minute book students

develop their ability to draw on their knowledge to solve problems and think on their feet. Another benefit is you can gain invaluable insights into individual and class-based misconceptions and strengths. You can also build meaningful relationships with your students, and it only takes 5 minutes each week. Sound impossible? Come along and participate in the 5-minute book to see the true benefit.
Theme: Critical & Creative Thinking
Primary Audience: Year 11-12

A24

Rethinking Practical Work
Ms. Bianca Trollope & Ms. Lauren Farrugia, Freelance (Vic)
This session is all about supporting you the teacher, during practical lessons. We will introduce and model various structured, explorative thinking strategies. The aim is to arm Science teachers with effective and easy tools to shift any practical activity away from the disconnected 'process-following' experience into meaningful student-directed explorations and discovery. Examples of clear and simple prompts that encourage students to become more autonomous and intimate with their learning will be presented, taking the pressure off teachers to make explicit connections between observations and theory.
Theme: Critical & Creative Thinking
Primary Audience: Year 11-12

WORKSHOP ABSTRACTS (STREAM B)
MONDAY 8 JULY

B1

Artificial Intelligence: Both an enemy and a friend - integrating the 'Next Big Thing' into a contemporary science classroom.

Mr. Michael Hayes, Peninsula Grammar School (Vic)

Artificial has been a hot topic for educators since the inception of ChatGPT and other similar tools in in 2022 and 2023. Viewed as a threat to originality and forever a looming threat generating student plagiarism, how can teachers turn this new development into the latest tool in their repertoire? In this presentation, we will be discussing key topics of relevance to a contemporary science educator seeking to maintain a modern classroom, such as:

- Recognition of AI generated work and the steps and methods for avoiding plagiarism in SACs and coursework.
- Integrations of AI tools into comment writing, feedback, data maintenance and more.
- Adjusting to a modern mentality of AI and preparing for the future iterations of AI's impact on Education.

Theme: Teaching Science in the Future

Primary Audience: Year 11-12

B2

An ADHD teacher's guide to supporting students' needs.

Mr. Jason Harris, Inaburra School (NSW)

Have you ever forgotten where you left your phone? Walked out of the house without your keys? Turned up to class and left your worksheets on your desk? As a teacher with ADHD, I regularly experience all of these problems, and I've had 30 years to develop systems and strategies. Imagine how much harder and frustrating this would be for students with ADHD. In this interactive presentation, delegates will gain a perspective of some of the difficulties and struggles students with ADHD and ASD experience. They will gain an insight into challenges these students have to overcome just to get to their classroom and be provided with strategies to help their students succeed. Delegates will leave equipped with ideas, structures, and resources to help them meet the needs of their students back in their classroom.

Theme: Education for All

Primary Audience: Year 7-8

B3

Building scientific knowledge

Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)

The scientific knowledge that we support our students to build across their schooling journey sets them up to be creative thinkers, critical consumers, and future scientists. This session will unpack why building knowledge matters and what evidence-informed approaches we can take to doing so in science teaching, including: memory and cognitive load; worked examples; misconceptions; and building vocabulary.

Theme: Education for All

Primary Audience: Year 7-8

B4

Online Earthquake discovery

Dr. Michelle Salmon, The Australian National University (ACT)

Come and learn how you can be a part of the Australian Seismometers in Schools program. Earthquake science is multidisciplinary providing real world connections with geology, physics, engineering, and human behaviour. We see the effects of earthquakes every year in the news. In this workshop we will demonstrate how these events can be used to engage with students about how waves travel through the earth, how we record them and why they cause so much destruction. Our workshop aims to provide teachers and techs with the resources to discover online resources, apps and information on earthquakes, active tectonics, and seismic hazards. We will give live demonstrations you can follow, so teachers should bring their computers, tablets, or smartphones.
Theme: Education for All
Primary Audience: Year 9-10

B5

Physics Playground - Exploring High School Physics
Mr. Stuart Lewis, Scientrific (ACT)
“Physics is science where you think with your hands”. Are you looking for ways of collecting data related to experiments in the Australian Curriculum – Physics (Especially when inertia keeps you at home)? This workshop explores Physics using Vernier Dataloggers. With multiple workstations, and support from our presenter, participants will use dataloggers to explore different physics experiments. Topics will include:
• Examining motion using a Motion Probe, a Photogate and Video Analysis
• Investigating electrical induction using magnets
• Magnetic fields in a coil
• Newton’s Laws of Motion
Theme: Education for All
Primary Audience: Year 9-10

B6

Developing a Primary STEM Program: An Inquiry and Budget-Friendly Approach
Mrs. Brittney Downer & Ms. Michelle Meracias, Ngarri Primary School (Vic)
This session provides steps for developing a holistic primary education STEM program that uses an interdisciplinary approach that is engaging and meaningful for students. This approach evolves with students' developmental stages, ensuring age-appropriate learning and technology are aligned with curriculum goals. This session will offer practical strategies to implement a robust STEM curriculum, using Inquiry and digital learning in meaningful ways. Additionally, this session highlights student agency, interdisciplinary connections, enriching learning experiences and promoting deeper understanding. Through examples, this session equips primary classroom teachers and specialist teachers with insights and strategies to develop STEM programs that engage students effectively while meeting educational standards and budgetary needs.
Theme: Interdisciplinary
Primary Audience: K-6

B7

Design Sprints for Future-Focussed Ideation
Ms. Anam Javed, Victorian Academy of Teaching and Leadership (Vic)
Design sprints have been used by innovation pioneers to drive thinking towards future-focussed, innovative, and enduring solutions to real-world problems. This session is focussed on modelling design sprints, to address interdisciplinary "wicked problems".
Theme: Interdisciplinary
Primary Audience: Year 7-8

B8

Empowering Tomorrow's Innovators: Science Educators Shaping Futures through Communication and Sustainable Development

Mr. Jay Chew & Ms. Farah Deeba, Al-Taqwa College (Vic)

The workshop focuses on improving students' science communication skills across Physics, Chemistry, Biology, and Astronomy within middle and senior school science curricula. Our students have actively participated in the Sleek Geeks Science Eureka video competition and the TED-Ed Student Talks program, where they prepare speeches to explain scientific concepts. Our primary goal is to identify solutions to daily challenges related to energy usage in nature, the utilization of renewable and non-renewable energy sources, energy transformations in chemical reactions, and the energy dynamics involved in the life and death of stars. The workshop will feature hands-on activities to facilitate group discussions and collaboration among fellow educators. We aim to engage students in science and enhance their science communication skills, empowering them to become agents of change in addressing Sustainable Development Goals such as SDG7: Affordable and Clean Energy and SDG13: Climate Action.

Theme: Interdisciplinary

Primary Audience: Year 9-10

B9 (shared)

How Can Experts' Reports Lead Astray? – Introduction of a Learning Environment Suitable for the Use in Different Focus Areas of CONASTA

Prof. Claus Bolte, Freie Universität Berlin, Germany

In our workshop "How Can Experts' Reports Lead Astray?" the participants get familiar with a learning environment which aims at students' competence to properly reflect their own opinions, ideals, and values and those of other people/parties (with specific abilities and/or different interests, e.g. science experts, politicians, lobbyists, consumers, peers etc.). Starting point is the scenario when people have to justify a personal decision, or experts have to create a scientific report – e.g. on a sustainability topic (such as the use of renewable energy sources). We will provide insights into specific heuristics which help students to reflect how and why people or expert reports sometimes come to different judgments and decisions which lead them to recommend or carry out more or less sustainable actions. The aim of the exercise is not just the result of the evaluation itself but, more importantly, the process of the evaluation and the students' reflection in the group. We hope the participants will appreciate the learning environment and put it into practice in their lessons.

Theme: Sustainability

Primary Audience: Year 9-10

B9 (shared)

Examining Student Experiences in Kids' Innovation Challenge (KIC), an Integrated STEM practice at Philippine Science High School

Mary Sheryl Saldon-Raznee, Queensland University of Technology & Philippine Science High School (Qld)

Philippine Science High School (PSHS) launched its integrated STEM initiative called Kids' Innovation Challenge (KIC), a co-curricular activity that incorporates design thinking and engineering design approaches in solving real world problems. In the recently concluded KIC, year 10 and year 11 students produced portable household toilet designs and rainwater collection kiosks with filtration system using sustainable construction materials. The scaled models with their blueprints were then used to construct prototypes in impoverished and disaster hit areas in the Philippines. This study aimed to document and assess the impact of this co-curricular integrated STEM program. For data gathering, a longitudinal panel study was conducted. Results showed that despite having additional workload, students found the activity relevant to their

STEM learning. The outcome of the study further supports the literature on the impact of co-curricular STEM programs despite time and commitment constraints.
Theme: Interdisciplinary
Primary Audience: Year 11-12

B10

Bridging the boundaries: Developing tomorrow's innovators through interdisciplinary and transdisciplinary approaches in science education
Miss. Stella O'Toole, Southern Cross University & Mrs. Linda Chui, MLC School Burwood (NSW)
Join Stella and Linda as they dive deep into interdisciplinary and transdisciplinary curriculum approaches in science, unravelling their transformative power within a secondary setting. A key focus for this presentation will be Science with Design and Technology; examples of Science with Geography, Visual Arts, and Languages will also be explored, demonstrating the capacity for this approach to be applied across many curriculum disciplines. By seamlessly integrating scientific learning opportunities in this way, students are immersed in real-world experiences that transcend disciplinary confines. Through their collaborative efforts over many years, Stella and Linda will demonstrate how interdisciplinary and transdisciplinary approaches can cultivate a student's critical thinking and problem-solving skills, which, combined with creativity, are essential for tomorrow's changemakers, innovators, and leaders. This presentation will showcase tangible examples of applied learning opportunities where students have engaged in hands-on projects that have fostered a deep understanding of scientific concepts.
Theme: Interdisciplinary
Primary Audience: K-12

B11

Hands-on digital experiments to teach students science and data.
Dr. Michael Kasumovic, University of New South Wales (NSW) & Mr. Karl Klose, Loxton Lutheran School (SA)
Inspiring students to love science and data can be difficult, especially if students have preconceived notions about science, data, and maths. In this session, we outline a game-based approach we use to engage and excite our students about science and exploring data. As a group, we will use mobile games to collect data in real time which we will explore in graphs that are teachers and students. We will explore different types of data, create hypotheses and predictions, while testing those predictions in real time. Participants will experience exactly what their students experience. We will discuss why a game-based inquiry approach is beneficial for students and how this approach encourages critical and creative thinking, while also providing students with the intrinsic motivation necessary to discover more. This is a highly interactive session, and teachers will be provided with all the necessary tools to run sessions like these with their students.
Theme: Teaching Science in the Future
Primary Audience: K-6

B12

The digital revolution and evolution of the new Primary Connections
Ms. Helen Silvester & Ms. Jennifer Lawrence, Australian Academy of Science (Vic)
Since 2003 Primary Connections has been at the forefront of science education, using research and extensive classroom trialling to develop its pedagogical approach and resources. Primary Connections has provided resources, guidance, and professional learning for hundreds of thousands primary teachers, supporting the teaching of science in primary schools across Australia. In response to the release of the Australian Curriculum V9, Primary Connections has evolved our pedagogical approach to reflect contemporary educational research. Join us to see

our new digital offerings and be among the first to explore the new teaching sequences and professional learning resources.
Theme: Teaching Science in the Future
Primary Audience: K-6

B13

Writing a great scientific research report
Mr. Chris Bormann & Dr. Sham Nair, Department of Education (NSW)
This workshop discusses the key elements of a high-quality Scientific Research Report. During the presentation, the report writing process will be unpacked, and the expectations of the different report sections will be discussed. The presenters will also discuss some common mistakes students make when constructing their reports. The workshop will conclude with an interactive session on assessing the Scientific Research Report.
Theme: Teaching Science in the Future
Primary Audience: Year 11-12

B14

Why do I need to know this (quantum edition)?
Dr. Kristen Harley & Dr. Lachlan Rogers, ARC Centre of Excellence for Engineered Quantum Systems, University of Newcastle (NSW)
We're currently living through the second quantum revolution. One of the five priorities identified in the Australian Government's National Quantum Strategy, released in May 2023, is building a skilled and growing quantum workforce. This is a huge opportunity for current students—not just within traditional physics disciplines, but across engineering, policy, manufacturing, ethics and more. Today's students could become some of the first ever quantum engineers. But one thing we heard repeatedly from teachers at CONASTA70 was that (quantum) physics concepts in the curriculum can seem very abstracted from the real world. In this workshop, we'll discuss current and future quantum technologies and provide real-world context for some of the physics concepts in the curriculum. You'll take away cheat-sheets on quantum for your discipline—be it biology, chemistry, physics (or maths)—ideas to engage students in quantum, and answers to the age-old question, "why do I need to know this?"
Theme: Teaching Science in the Future
Primary Audience: Secondary

B15

Developmental Learning with Good Science
Ms. Cristy Herron, Matilda Education (Vic)
The Science teachers at Geelong Grammar School have been exploring ways to incorporate developmental philosophies into our learning programs. One way we've done this is by creating inquiry tasks underpinned by developmental rubrics, however, this can be very onerous for teachers. Luckily, the new Good Science textbooks have interpreted state curriculums using a developmental framework to make it easier for teachers to shape a 'developmental' tomorrow. In this session, I will share my perspective as a developmental learning consultant and author for Matilda Education. Together we will explore how the new Good Science Textbooks can assist you in transforming your classroom into a place where all students experience progress and growth for any given Science topic or skill. We will also look at the developmental Learning Ladders that accompany each content topic and inquiry skill of the text and discuss how they can be used by science educators to shape tomorrow.
Theme: Teaching Science in the Future
Primary Audience: Year 7-8

B16

Science Education

Ms. Rosa Zwier & Ms. Emilie Nachtigall, Museums Victoria (Vic)

AI is everywhere, and its impacts show no signs of slowing down. From generative platforms like OpenAI's Chat GPT, to self-driving cars and intelligent robots to improve health care, AI is redefining an era of technological innovation, transforming how we live, work, and experience the world. As science educators during this emergence of AI, we have a challenging road ahead. Children of the future will need to be armed with critical thinking skills, digital literacy, and the data confidence. How do we ensure that our students are prepared? How should our science teaching practices change in light of these new technological developments? Should we, teachers, use these tools? How do we teach students about these tools? In this session we'll discuss generative AI, tangible ways we can use it in science education, how we can teach students about it, and some of the ethical considerations.

Theme: Teaching Science in the Future

Primary Audience: Secondary

B17

Gallipoli Balloon Bursters (Drip Balloons) and Trip Wire Balloon Bursters (Trip Balloons): The Ultimate STEM Challenges.

Mr. Spiro Liacos, Cheltenham Secondary College (Vic)

Gallipoli Balloon Bursters: In this activity, students have to design and build a water-powered contraption that automatically bursts a balloon after a small-time delay. They use retort stands, clamps, string, cups, pins, icy-pole sticks, and plasticine. The activity is based on the Drip Rifle, which was set up by Anzac soldiers in the trenches of Gallipoli in World War I. Trip Wire Balloon Bursters: In this activity, students have to design and build a contraption that automatically bursts a balloon when a person walks through a trip wire which triggers the contraption. Every "device" that has ever been invented from light bulbs to lunar landers had to be imagined, built according to existing knowledge, tested, redesigned, and rebuilt until the device worked consistently and worked well. These fantastic activities introduce students to the engineering design process. So come along and learn how to run them in your classroom!

Theme: Critical & Creative Thinking

Primary Audience: Year 9-10

B18

The Art of Science or the Science of Art

Ms. Sarah Edwards & Ms. Birra-Li Ward, Frankston High School (Vic)

Explore the collaboration of Art and Science with a focus on bioplastic production and sustainability in this workshop. Sarah Edwards and Birra Li-Ward will bring us together to the big question of how our learning impacts the local and global environment now and in the future. Together, we will guide participants through the production of bioplastics and demonstrate the different ways this sustainable, reusable material can be used creatively before being melted back down to be reused again the following year. The bioplastics created can also be passed on to other staff for use in their curriculum areas, such as Chemistry, environmental science, geography, product design and visual arts.

Theme: Sustainability

Primary Audience: Year 9-10

B19

Enacting Climate Change Education through representing scientists' practice.

Prof. Russell Tytler & Assoc. Prof. Peta White, Deakin University (Vic)

The climate crisis places a burden on how we should prepare young people for a challenging future that encompasses changed social practices associated with the energy transition, endangered materials, biodiversity crises, and big data. Contemporary science is at the forefront of these transitions/challenges, and school science needs to represent scientific knowledge and practice in a way that prepares students as active agents in this future. In this session we will explore how in our research project (https://enactingclimatechangeeducation.deakin.edu.au) we work with Years 5-10 teachers to introduce contemporary climate science research such as climate monitoring, energy transitions, biodiversity, and mitigation strategies into classroom sequences. We make a case for extending school science curriculum and practice to include activities that focus on student decision making and agency in relation to socio-ecological challenges. We will share some teaching and learning sequences and activities and invite participants to consider how these might be adapted to their own context.
Theme: Climate Education
Primary Audience: Science Education Research

B20

How Geology influences Biology and the Big 5 Extinctions

Mr. Andy Mills, Teacher Earth Science Education Programme (Vic)
Evolution of life on Earth has been influenced by a variety of factors through the history of our planet. These include plate tectonic, volcanic, climate and solar system-related events and processes – that have provided atmospheric, oceanic, and terrestrial conditions for life to flourish – and have also led to extinction events – including the big 5 mass extinctions. TESEP's professional development workshops and webinars examine how life explosions and mass extinctions on Earth were influenced by geological, galactic, and planetary events and processes, by chronicling the fossil record with these events and processes. This topic incorporates aspects of plate tectonics, climate change through time, biology, fossils and stratigraphy, and our place in space, particularly Stage 5 to senior secondary, with a crossover with biology.
Theme: Climate Education
Primary Audience: Year 9-10

B21

Curiosity and Creativity in learning science

Ms Katrina Elliott, Department for Education (SA)
Designing creative and curious science learners. We know curiosity disappears when the focus is on right/wrong answers but is best when it's 'almost knowing'. Creativity includes risk-taking, playfulness, using imagination, and intuition in learning. Collectively we will consider: How can we design tasks that include how learners feel, think, learn with others, and manage the process of learning? How can we design tasks that stretch, require resilience, and 'have a go'? Effective learning dispositions support children to deal with change and challenges throughout life as well as being engaged to learn science.
Theme: Critical & Creative Thinking
Primary Audience: Year 7-8

B22

Modelling Amino Acid Properties Using Gel Electrophoresis

Dr. Belinda Stumer, Craigslea State High School (Qld)
Amino acids are naturally occurring chemical compounds that are integrated into biochemical pathways and are used to build proteins. They contain a central carbon atom on which is bound an amino group (- NH2), a carboxylic acid acid group (- COOH), a hydrogen and an "R" group which consists of 20 different structures. Changing pH causes amino acid molecules to become charged and interact with electric fields, allowing separation by electrophoresis.

In this session, since it is difficult to visualise amino acids due to their clear nature, participants will undertake a practical simulation of amino acid separation via electrophoresis. The experiment will use coloured dyes, which form differently charged molecules at a buffered pH. The concept of amino acid charge, formation of Zwitterions and isoelectric point will be demonstrated and relevance for senior science curriculum areas will be discussed.
Theme: Critical & Creative Thinking
Primary Audience: Year 11-12

B23

Teach Skills, Not Facts
Assoc. Prof. Melanie Trecek-King, Massasoit Community College (USA)
This presentation explores a general-education science class designed to teach critical thinking, information literacy, and science literacy skills. Focusing on science's process over its findings can empower students to evaluate claims and make wiser decisions. Additionally, having students create misinformation can inoculate them against it in the "real world."
Theme: Critical & Creative Thinking
Primary Audience: Year 11-12

WORKSHOP ABSTRACTS (STREAM C)
TUESDAY 9 JULY

C1

Exploring the Universe in 3D: Immersive Learning with ASTRO 3D VR

Dr. Delese Brewster, ARC Centre of Excellence for All-Sky Astrophysics in 3D (ACT)

Embark on an epic adventure that will take you beyond the limits of the classroom to unlock the mysteries of the Universe like never before!

ASTRO 3D has developed an immersive virtual reality curriculum for Year 10 students, enhancing engagement and comprehension of complex astronomical science. This program fosters collaboration and exploration in a virtual environment, integrating mathematics, digital technologies, and science to bridge theoretical concepts with tangible experience. Join astronomer avatar Kirsten Banks on the Universe 3D Space Telescope to see the formation of sub-atomic particles, build your own hydrogen atoms, analyse helium spectra, and fly through the Epoch of Reionisation, all while aligning with the Year 10 curriculum. Designed for Meta Quest 2 headsets, the program is freely available for download from the Meta store, with ASTRO 3D offering a headset lending library for teachers, along with comprehensive resources for effective classroom implementation.

Theme: Teaching Science in the Future

Primary Audience: Year 9-10

C2

Closing the vocabulary gap in science

Ms. Katrina Elliott, Department for Education (SA)

“The limits of my language mean the limits of my world” Wittgenstein How far is the vocabulary gap an issue in your classroom? What is already working in your classroom? In this workshop we will look at a couple of Alex Quigley’s 7 steps in closing the vocabulary gap. Step 2 Teach academic vocabulary explicitly and clearly, with coherent planning throughout the science curriculum. Step 6 Foster ‘word consciousness’ in our students (e.g. sharing the etymology and morphology of words) We will look at some strategies to further enhance the teaching and learning of science to address the vocabulary gap and some literacy techniques to improve students’ reading and writing in science.

Theme: Education for All

Primary Audience: Year 7-8

C3

Inclusive representations in science teaching

Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)

For science teaching to be inclusive and engaging, it is vital that our students have opportunities to see themselves, their culture, history, and context reflected in what they learn - you can’t be what you can’t see. This workshop will unpack opportunities within the curriculum to include those that are currently underrepresented in teaching of specific science content and invite participants to discuss and contribute their own ideas. All resources shared will be freely available.

Theme: Education for All

Primary Audience: Year 7-8

C4

Could data save Humpty? A new approach to the classic egg drop

Mr. Stuart Lewis, Scientrific (ACT)

The key element of STEM is form and functional design in a problem-solving context. If you are looking for ways to engage your students in real world problem solving that incorporates design and testing regimes in an integrated cross-curricular approach, then this workshop is for you. The workshop challenges participants to design and test a device to prevent the fracturing of an egg when dropped. This will involve a functional engineering design, principles of science supported by data (Mathematics) to provide a solution (Technology). Don't worry about the mess! We will clean it up if your design doesn't "work".
Theme: Interdisciplinary
Primary Audience: Year 9-10

C5

Using Neuroscience to leverage retention.
Mrs. Patricia Corbin, The Lakes College (Qld)
Neuroscience has provided many insights into how the brain functions during learning - but how can we use them in the classroom? At The Lakes College the Science faculty has been using the findings of neuroscience to increase student retention and engagement. This presentation will focus on the implementation of neuroscience-based pedagogy in both senior and middle secondary science classes in a 7-12 co-educational setting. This was done using a simple 4-week model for improvement in which teacher led investigations into practice allows change to be manageable and continual. The challenges, both experienced in implementation and ongoing, will be addressed, and a model for continual improvement presented. Takeaways will include a range of resources and strategies to add value to existing pedagogical tools.
Theme: Education for All
Primary Audience: Year 11-12

C6

Assessing the Effectiveness of Design Thinking Pedagogy Across NSW Stage 3 and 4 STEM Learners
Ms. Georgia McCarthy & Ms. Maryam Kausar, University of Technology Sydney (NSW)
The UTS Women in Engineering and IT STEMxOutreach Program is a multi-touchpoint initiative aimed at Stage 3 and 4 students in NSW with the principal goal of engaging girls and young women in STEM pathways. The program incorporates design thinking pedagogy to facilitate engaging learning environments for STEM subjects. This ethics approved longitudinal project has been collecting data from student and teacher participants since 2019 and is now able to share interim conclusions about this multi-touchpoint intervention. We will share data and analysis on the impacts our programs have had on the primary and high school participants. This includes a discussion on program logic, how it was developed and strategy for achieving sustainability. Alongside this, the program provides opportunities for teacher engagement and professional development, increasing confidence and capacity in incorporating digital technologies into classrooms.
Theme: Education for All
Primary Audience: Science Education Research

C7

Integrating maths and science learning: Planning, doing and lessons learned
Dr. Joseph Ferguson & Prof. Amanda Berry, RMIT University (Vic)
Research shows that integrating mathematics and science can enrich student learning by providing relevant and meaningful experiences that promote positive attitudes towards both subjects. But how can teachers design lessons that effectively integrate these subjects and meet curriculum requirements? And how might teachers work together to co-teach integrated maths and science in the same classroom? In this session, we will share and discuss our experiences

of co-developing and implementing lesson sequences with researchers and teachers to apply knowledge and skills from both maths and science to investigate a real-world problem/scenario. This session will be relevant for those curious about implementing an integrated approach to teaching mathematics and science either individually, or with colleagues. The workshop is suitable for upper primary/lower secondary teachers, but all are welcome to attend. We will invite you to consider how the guidelines/lesson sequences might be utilised or adapted for your own contexts.
Theme: Interdisciplinary
Primary Audience: K-6

C8

Recognising our past, imagining our future: writing the histories of science teacher associations of Australia

Dr. Rod Fawns & Mr. Robert Roe, Science Teachers Association of Victoria, and Ms. Ruth Dircks, Australian Science Teachers Association (Vic & ACT)

In this session, authors and others who have contributed to the writing of STAV's 80th Anniversary History invite State Delegates and others at CONASTA71 to discuss the legacies and contributions of their founders and those who established the ways of doing things upon which each STA has relied in maintaining and transforming science teaching and science education in their State. A chronological record of the achievements of the past may be a part of the appeal but critical, interpretative accounts of each of our Associations as evolving, voluntary organisations, adapting to contextual changes are likely to be of great value in relation to deliberations about the future roles and policies in each State as well as the Commonwealth. Three historical themes seem implicit in writing such histories: constitution, communication, and control - including in each the formative changes in education context and the ways an STA responded to and/or influence such changes.
Theme: Interdisciplinary
Primary Audience: All

C9

An approach to science inquiry assessment

Assoc. Prof. Peta White & Prof. Russell Tytler, Deakin University (Vic)

Inquiry skills are an important component of a contemporary science education. Traditional approaches to school science practical work tend to offer a restricted view of these important practices and a misleading view of the nature of scientific knowledge building. The current emphasis on investigations implies a need for the systematic development of students' inquiry practices. The Science Inquiry Assessments (SIAs: https://science-inquiry-assessment.edu.au/) provide authentic activities for inquiry skills assessment that also act as exemplars for inquiry practices and teaching approaches. In the presentation we will describe the nature of the tasks and our experience in validating these with Years P-6 teachers. We emphasise the role of the teacher in engaging students in the purpose of inquiry tasks and in providing scaffolding to enable a differentiated but productive experience for students. We describe how these might be operationalised in schools and argue a need to extend this approach into secondary schools.
Theme: Teaching Science in the Future
Primary Audience: K-6

C10

Powerful Problem-Solving in Science

Dr. David Hosken, Scitech (WA)

This presentation introduces teachers to the Powerful Problem-Solving approach and a series of strategies that develop primary aged students' problem-solving skills – skills that are required to

address complex problems in the science classroom and beyond. The powerful problem-solving approach helps to support students to break down big problems, collaborate with others, generate ideas, and justify their solutions. As part of this presentation, we will present an overview of the powerful problem-solving outcomes achieved through our Lighthouse Maths delivery over the past four years and discuss how these insights can be used by science educators in their classrooms to shape the teaching of science for tomorrow.
Theme: Teaching Science in the Future
Primary Audience: K-6

C11

Gamification: Fad or Future
Miss. Stella Ding, The Ponds High School (NSW)
In today's rapidly evolving educational landscape, the integration of gamification holds immense potential to shape tomorrow's classrooms. This workshop explores the transformative power of gamified learning environments within STEM education. Through an investigation into the intersection of gamification and educational psychology, this research aims to equip educators with innovative tools to engage and motivate students effectively. Key focus areas include the examination of awards/points systems on intrinsic and extrinsic motivation, as well as the power of story driven learning and role play in boosting student engagement. I will be examining case studies from expert interviews and visits to schools in Australia, the US and Finland. Attendees of this presentation will gain actionable insights into the different perspectives on leveraging gamification to deepen student understanding and retention of STEM concepts. Furthermore, I will discuss practical frameworks which educators can apply to gamify their own classrooms.
Theme: Teaching Science in the Future
Primary Audience: Year 7-8

C12

Teaching Interactive Science Inquiries through the creation of Virtual Reality
Dr. Paul Unsworth, University of South Australia & Mrs. Rosanna Cotino, EdgedVR (SA & NSW)
Over the last 3 years Dr. Paul Unsworth and close colleagues have undertaken a series of STEAM based immersive projects that have explored and investigated how teachers and students can benefit from an applied use of immersive Virtual Reality (iVR) Authoring technologies. This practice-based research now concentrates its gaze on how iVR technologies when used in a science inquiry learning design:
(a) supports and transforms teacher' professional practice,
(b) engages students in processes of higher-order thinking, meaning-making and doing and
(c) produces evidence of confident, capable and creative learners (teachers and students).
Along with Industry partner Rosanna Cotino (CEO EdgedVR) and their teams are now progressing a hands-on VR in Schools program that is tailor-made for Science / STEM teachers situated both national and internationally. Activity is a series of interactive workshops that immerse teachers into the practice and pedagogy of teaching science through the creation of interactive VR projects.
Theme: Teaching Science in the Future
Primary Audience: Year 9-10

C13

Scaling effective teaching strategies in Science Extension – sharing and learning from the experiences of NSW teachers and students
Mr. Chris Bormann, Department of Education (NSW)
What should teachers consider when developing an effective Science Extension program at their schools? What are some best practices to support students engaging in their scientific research

projects? In this session, the presenters will share their findings from a project to document teachers' experiences in implementing the course and supporting students through the modules and the research projects. Through collegial discussions, participants will discover Science Extension's powerful impact on student learning and teachers' professional practice.
Theme: Teaching Science in the Future
Primary Audience: Year 11-12

C14

Awe and Wonder: Astronomy as a Gateway?
Dr. Saeed Salimpour, Deakin University (Vic)
Astronomy in addition to the awe and wonder possesses a unique curiosity piquing characteristic. This has led to it being often described as a "Gateway Science" whereby students who are exposed to astronomy in school are enticed to pursue science, and more specifically subjects like Physics, in senior grades. The validity of this statement, which is a ubiquitous viewpoint amongst some astronomy education and public outreach personnel, is based only on anecdotal evidence and there has been no empirical research investigating this notion. This presentation highlights the development and validation of multi-construct survey which explores whether astronomy is perceived as a gateway science by students. In addition, this presentation presents preliminary results from the Astronomy as a Gateway Science (AGS) survey, which was administered to over 300 students in Years 9-12 in Australia and Sweden which presents some interesting questions and some stark differences to consider.
Theme: Teaching Science in the Future
Primary Audience: Science Education Research

C15

Utilizing Artificial Intelligence and Interactive Media to Enhance Chemistry Education: A Case Study from RMIT Foundation Studies
Dr. Sawsan Freij & Mrs. Joanne Bradley, RMIT University (Vic)
This presentation highlights the development of interactive chemistry content at RMIT Foundation Studies. Using artificial intelligence, draft content and questions were generated to facilitate learning. Interactive quizzes were made using H5P and Engaging videos were seamlessly integrated, alongside the innovative inclusion of audio QR codes for poster task presentations. By showcasing these approaches, this presentation aims to inspire educators with adaptable ideas for enriching their own course designs.
Theme: Teaching Science in the Future
Primary Audience: Foundation year

C16

Understanding chemical hazard information
Dr. Phillip Crisp & Ms. Eva Crisp, Ecosolve Australia (NSW)
The common indicator, phenolphthalein, may cause cancer and is suspected of causing genetic defects and damaging fertility, according to Safety Data Sheets (SDSs). Borax, a key ingredient of 'slime', may damage fertility or the unborn child. Are lead salts so dangerous that students should never use them? SDSs vary widely in their assessment of the hazards posed by the same chemical! How do you make sense of hazard data according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)? We will explain the origin of GHS data and its limitations, reasons for the differences between SDSs and how to interpret safety data from a practical classroom perspective. Large numbers of chemicals can be used safely provided risks are assessed and control measures are put in place. This is important to maintain the interest of students in science and increase their enjoyment of practical experiences.
Theme: Teaching Science in the Future

Primary Audience: K-12

C17

Full STEAM ahead!

Mrs. Lisa Moloney, Connecting with Country (Vic)

There is science in art and art in science. This session explores some of the ways that science and art connect through eco-dying, string making and weaving. This is a great way to introduce First Nations perspectives, Sustainability, and the Science of Human Endeavour by putting Art into STEAM.

Theme: Indigenous Perspectives

Primary Audience: Secondary

C18

'The Science Within Us', a digital resource exploring our genetic identity.

Ms. Arena Nilsson, Genetic Support Network of Victoria (Vic)

The Genetic Support Network of Victoria presents "The Science Within Us," a novel genomics educational resource aligned to the national curriculum for students aged 10-18 and endorsed by Australian Genomics. With the rapid advancements in genetics and genomic technologies, we understand this knowledge will critically inform and shape our students' health decisions in the future. Created with the voices of Australian children living with genetic conditions, this program enriches the students' genetic literacy, fosters inclusivity, and promises to impact future generations positively. We provide a comprehensive and accessible resource, that encourages acceptance of diversity through storytelling. Students explore ethical challenges of genomic testing and discover career pathways in genetics and genomics. In this conference, we will simulate a Year 7-8 lesson module, demonstrating how personal experiences and storytelling can enhance understanding of genomics. We believe that this initiative not only empowers informed decision-making but also nurtures a compassionate society to shape the community of tomorrow.

Theme: Sustainability

Primary Audience: Year 7-8

C19

Nanoaquaria for ecological investigation

Mr. Brian Stumer, Craigslea State High School (Qld)

There are many educational benefits of keeping an aquarium, ranging from students developing an appreciation of the ecology of natural systems to the chemistry of water quality. Although many schools may have an aquarium, it is not always available or accessible for a class full of students to gather data. This session will cover how small student groups can set up, monitor, and experiment with "nanoaquaria" over a period of weeks. These aquaria can then be dismantled or taken home by interested students. Long term data can be obtained on Nitrogen levels (Ammonia, Nitrite, Nitrate) to investigate Nitrogen cycling; growth rates of floating plants or pH changes associated with succession. Shorter term data can include changes in dissolved oxygen, atmospheric carbon dioxide or pH associated with photosynthesis and respiration. Microscopic observations of microflora and fauna can also be investigated, including construction of ecological relationships between organisms in a closed ecosystem.

Theme: Sustainability

Primary Audience: Year 9-10

C20

Climate Science: A Perfect Introduction

Mr. Spiro Liacos, Cheltenham Secondary College (Vic)

This session will provide you with lots of resources with which you can teach your students a basic climate-science unit. With these resources (which include work sheets and pracs), you will be able to teach your students what causes seasons, how the movement of the sun across the sky affects climate and the renewable-energy industry, what causes winds, how the climate of a region is affected by its proximity to oceans, and a whole lot more. These resources are just what you need in the current climate!
Theme: Climate Education
Primary Audience: Year 9-10

C21

Citric Acid: Unveiling its Versatility - A Hands-On Science Workshop!
Mr. Jacob Strickling, Australian Christian College (NSW)
This workshop focuses on the versatile applications of citric acid in future High School Science classes. Despite its underutilisation, citric acid offers valuable opportunities for hands-on exploration of acid-metal, acid-base reactions and the effect of temperature and concentration on chemical reactions. Through practical demonstrations and hands-on activities, teachers will learn how to integrate citric acid into their curriculum effectively. Furthermore, citric acid's suitability for individual student practical assessment tasks will be discussed. By the end of the workshop, participants will gain a deeper understanding of citric acid's role in science education and how it can enhance the student learning experience.
Theme: Sustainability
Primary Audience: Year 7-8

C22

Evidence-based argumentation - a collaborative approach
Mr. Patrick Griffin, Centenary State High School (Qld)
I present a pedagogical strategy to engage students in authentic scientific thinking within the context of evidence-based argumentation. A key requirement for science educators in their quest to shape the future is to produce effective thinkers and communicators. Argumentation is the language of science. Members of the scientific community engage with each other and with the scientific process through argumentation. When students engage in argument they are thinking and acting scientifically. This strategy is intended to be enacted with increasing complexity from year 7 to year 10. It includes direct instruction related to the elements and structure of argument, practicing arguments, and engagement in authentic evidence-based argumentation. A key feature of the strategy is the creation of effective collaboration spaces that encourage dialogue and drive thinking forward. This strategy integrates curriculum requirements, most notably, Critical and Creative Thinking and Personal and Social Capability integrate with the three science stands.
Theme: Critical & Creative Thinking
Primary Audience: Year 7-8

C23

Innovative physics equipment designed in Australia.
Mr. Peter Mansell, Haines Educational (Vic)
The theme of the session will be to demonstrate some of the unique products invented/designed in Australia for capturing and stimulating the minds of physics students. Products showcased will include those that demonstrate how/why power loss in transmission lines is reduced; how teachers can quickly and easily convert their dynamics cart into a fan cart and demonstrate vector forces and Newton's Laws; demonstrating unique and visual way of explaining the inverse square law; conversion of kinetic energy into heat; an easy and convincing way of experiencing

sound nodes (interference). If time permits, there will be an opportunity for attendees to have a play with the items of equipment presented.
Theme: Critical & Creative Thinking
Primary Audience: Year 11-12

C24

Using Problem Based-Learning in the Science classroom.
Miss. Caroline Cotton, BioBrain (Vic)
Looking for a new way to teach your students the same content? Come to this session to learn how to develop active learners who learn to solve real life problems while using critical thinking!!! This will result in more engaged learners!! We will go through the nuts and bolts of problem-based learning. You will be provided with examples and takeaways that you will be able to use with your students.
Theme: Critical & Creative Thinking
Primary Audience: Year 11-12

C25

Primary Science student enactment of Impactful Inquiry that 'makes a difference'.
Mrs. Melinda Kirk & Dr. Joseph Ferguson, Deakin University (Vic)
In the face of growing socio-ecological challenges, we report an impactful inquiry approach encompassing all three strands of the science curriculum (understanding, skills, and science as a human endeavour) with citizenship perspectives and the general capabilities (ACARA, 2022) meaningfully embedded. Drawing from curriculum and student experiences, we outline nine key principles that support student pursuit of science-informed desired change in a matter of significance. Responsivity to student voice and agency to enact change is supported as students explore ideas, initiate inquiries, investigate, interpret, interrogate (identifying issues/possibilities), infer, innovate, implement, and inform science-grounded change. These principles of impactful inquiry guide students through issue identification, solution generation, innovation implementation, and stakeholder involvement. In this way, impactful inquiry seeks to prepare students with the capacity and efficacy to pursue positive science-informed change in matters that matter to them now and into the future.
Theme: Critical & Creative Thinking
Primary Audience: K-6

WORKSHOP ABSTRACTS (STREAM D)
TUESDAY 9 JULY

D1

Exploring Resources for Integrating Cultural Knowledge in the Chemistry Classroom

Dr. Emily Rochette, University of Melbourne (Vic)

What does it mean to have a knowledge of chemistry? In this workshop we explore how to develop a broad understanding of cultural knowledge by trialling and critically reflecting on resources designed to incorporate Indigenous knowledge and perspectives into the chemistry classroom. This workshop will introduce teachers to a variety of resources that could be adapted and/or modified for classroom use and they will explore practical activities for making bush soap and undertaking a steam distillation to isolate and test plant oils for medicinal properties.

Theme: Indigenous Perspectives

Primary Audience: Year 9-12

D2

Clues from the brain of an Autistic ADHDer explain how to engage ALL your students when teaching STEM.

Dr. Lorien Parker, Scienceplay Kids (Vic)

Dr Loz is an Autistic/ADHD biochemist and educator whose worked with over 10,000 students, in over 120 schools. In this session she'll share her "recipe" for creating interesting/memorable STEM learning opportunities that engage the full range of diverse learners using readily available and low-tech materials. She'll use experiential and hands-on approaches to take you through the science behind how the brain takes-in, stores and retrieves information so that you can understand the "why" behind successful learning and easily implement it in your classroom.

Theme: Education for All

Primary Audience: K-6

D3

Connecting the Dots: Integrating STEM Across Disciplines

Mrs. Claire Hughes, University of Adelaide (SA)

STEM education is most powerful when it transcends disciplinary boundaries and encourages students to form connections between discrete fields of study. In this workshop we will use dynamic discussions, case studies, and interactive elements, to explore opportunities for interdisciplinary collaboration and connections between STEM disciplines and other subject areas. Discover how to seamlessly integrate STEM concepts with social studies, language, arts, and other content areas to provide a holistic learning experience that reflects the interconnectedness of the world. We'll showcase how by embracing an interdisciplinary approach, educators can foster creativity, critical thinking, and ethical reasoning in students, empowering them to become holistic problem solvers and innovators, equipped to embrace the world they will inherit. Join us on this journey to connect the dots, shape interdisciplinary thinkers, and revolutionise STEM education for the future.

Theme: Interdisciplinary

Primary Audience: Year 7-8

D4

Awesome hands-on demonstrations: a cross-curricular Earth science perspective on STEM teaching

Mr. Joe Fayle, Geoscience Australia (ACT)

Spark curiosity and wonder in your classroom with hands-on demonstrations that link science to the real world, and fundamental concepts in STEM. This inquiry focused workshop will explore highly engaging, well-constructed scientific demonstrations, and how they can be adapted into inquiry activities. Participants will use examples from Earth science to investigate fundamental principles in clean energy generation, ocean carbon sinks, electrical conductivity of materials, and even the optical properties of the 'sunstone' thought to have been used by seafarers during the Viking age. Earth science is a powerful platform to explore the cross-curricular nature of science and the importance of science in society. With these demonstrations, you can put the 'geo' into other scientific disciplines and show students GEOphysics or GEOchemisty in action. You will walk away equipped with information and inspiration to boost the use of high impact demonstrations in your classroom.
Theme: Interdisciplinary
Primary Audience: Secondary

D5

Capturing the Cosmos: Astronomy as a gateway for interdisciplinary teaching and learning

Dr. Michael Fitzgerald & Dr. Saeed Salimpour, Deakin University (Vic)
The night sky connects our species through space and time, across rich diverse cultures –under one sky. The awe and wonder of the Cosmos unlock imaginations and has inspired thinkers and creators to explore some of the most fundamental questions about the Cosmos from various viewpoints. Astronomy gives students a Cosmic Perspective, and provides students with the opportunity to engage with, and appreciate the deep connections between, STEM and non-STEM disciplines. This has implications for supporting students to develop the skills and knowledge to enable them to tackle the challenges humanity will face far into the future. This workshop provides teachers with experience with how astronomy can be used as a context within curricula to bring in contemporary scientific perspectives and practices together with visual art aesthetics and creative interdisciplinary exploration as well as addressing the straight science in the curriculum. Teachers will have the opportunity to engage with authentic data collected from a network of research-grade robotic telescopes (Las Cumbres Observatory and PhotonRanch), available for use beyond the workshop, together with practical resources and support on how to bring this awe and wonder into their own classrooms.
Theme: Interdisciplinary
Primary Audience: Year 9-10

D6

Using the LIA (Launch, Inquire, Act) Framework to provide depth in science and STEM inquiry.

Ms. Helen Silvester, Australian Academy of Science & Prof. Russell Tytler, Deakin University (Vic)
There are many elements involved in the design of a science unit, from the needs and capabilities of students to the core science concepts and key ideas outlined by the curriculum; from developing scientific skills to providing real-world context. Designed by the Australian Academy of Science and using contemporary education research, the LIA Framework provides a scaffolded approach to the development of quality teaching sequences that increase a student's knowledge and skills, as well as their science identity and enjoyment of science. Join us for this interactive panel session as we outline and model the LIA Framework through provided examples and workshop your ideas of how the Framework can be used to build student capability in your school.
Theme: Teaching Science in the Future
Primary Audience: Year 7-8

D7

Day 1 in a self-paced, mastery-based classroom: A student's perspective

Mrs. Rachel Peach, Inaburra School (NSW)

What does it feel like to be a student in a self-paced, mastery-based classroom environment? How do students interact with blended instruction and engage in authentic collaborative learning? In this classroom-style presentation, delegates will become students entering the class on day 1 of their new experience. They will gain a student's perspective on learning through self-paced direct instruction, structured collaboration, and reflection. They will engage with inbuilt differentiated materials and a range of motivational strategies to keep them progressing through Unit Zero as they learn the organisational elements of this self-paced learning model. And everyone will be quizzed on what they learn using mastery based formative assessment. Having experienced the controlled chaos of this style of learning, delegates will be equipped with ideas, structures and resources to launch their own self-paced, mastery-based classroom when they return home.

Theme: Teaching Science in the Future

Primary Audience: Year 9-10

D8

Astronomy as a Context for Data Science with your Students

Mr. Robert Hollow, CSIRO Space and Astronomy (NSW)

Astronomy is a discipline in which real scientific data is freely and easily accessible. Current and upcoming astronomical facilities will produce massive datasets. This makes it an ideal area for both first-hand and second-hand student investigations with the potential to undertake engaging and exciting projects. Local and international examples of where to access and how to use data to engage and challenge students are provided. Topics from exoplanets, pulsars and galaxy classification are explored and key databases and citizen science tools identified. We will work through some activities using the data. The possibilities for open-ended student investigations and citizen science are discussed. Upcoming projects and data challenges are highlighted.

Theme: Teaching Science in the Future

Primary Audience: K-12

D9

Experience the Modern STEM Classroom through Gamifying Earth Science

Ms. Suzy Urbaniak OAM & Mr. Jett Coletti, CoRE Learning Foundation (WA)

Join acclaimed Earth Science educator and geologist Suzy Urbaniak OAM for a fun and interactive session where you will learn how to transform your Earth Science learning to become the highlight of your curriculum. Discover with us the innovative gamification STEM strategies that will modernise your classroom, fostering student engagement and cultivating critical thinking skills. This nationally adopted, modern classroom experience has been designed to suit the range of diverse learning styles, creating an inclusive environment where every student thrives.

Theme: Teaching Science in the Future

Primary Audience: Year 4-12

D10

Constructing meaning using assessments to promote learning in science.

Dr. Sham Nair, Department of Education (NSW)

Can assessments promote learning? A large and significant volume of research suggests that they can. In this interactive workshop, participants will explore various assessment modalities to determine their effectiveness in promoting deep learning and knowledge construction. Teachers

will discover how well-designed, low-impact assessments not only facilitate learning but also inform future teaching and learning trajectories. Such approaches have the capacity to transform science education in our current and future classrooms.
Theme: Critical & Creative Thinking
Primary Audience: Year 11-12

D11

Questacon's Cyber Team Red: Using tabletop gameplay to explore cyber security careers and skills.
Mr. Lachlan Agett, Questacon (ACT)
Assume the role of an elite cyber security team and use your characters' unique talents and abilities to investigate a mysterious cyber incident! This tabletop role-playing game asks players to use their imagination to construct a world where they explore cyber security concepts and contemplate related professions. Played in a choose-your-own-adventure format your character will be an expert in physical security, social engineering, cyber intelligence, or cyber operations. Players join forces and use critical thinking and collaboration to navigate challenges and complete the mission. This interactive session will share tips for first-time Game Masters and provide resources, knowledge, and experience to facilitate a Cyber Team Red session. We'll introduce workshop participants to game themes, rules, and core mechanics, and undertake a challenge to play through some game encounters. The game is suitable for upper primary and high school students and can be played in-class or with after school groups.
Theme: Critical & Creative Thinking
Primary Audience: Year 9-10

D12

Shaping Tomorrow's Scientists: Uncovering the Unseen with Australian Ingenuity
Ms. Jackie Bondell, University of Melbourne (Vic)
In shaping tomorrow's science education landscape, we ponder: How can we uncover the invisible? How do scientists engineer experiments and instruments to explore the Universe's most elusive phenomena? Australia stands at the forefront of pioneering research in modern physics and astronomy, delving into realms such as Dark Matter and Gravitational Waves. Australian scientists ingeniously tackle the challenge of detecting the unseen. This interactive session will spotlight Victoria's SABRE Dark Matter Detector and the LIGO Gravitational Wave detectors, showcasing the fusion of engineering and science. These innovations will ignite inspiration for a series of affordable, hands-on activities aimed at immersing students in scientific inquiry and the engineering design process. Teachers will engage in these lessons and receive kits with curriculum links, empowering them to integrate these activities into their classrooms. The objective is to equip educators with a toolkit of engaging activities that cultivate students' creativity in addressing tomorrow's profound scientific inquiries.
Theme: Critical & Creative Thinking
Primary Audience: Year 7-8

D13

Flights of Fancy: Critical and Creative Thinking in Aerodynamics Education
Dr. Graham Wild, University of NSW (NSW)
This presentation delves into the intersection of critical analysis and imaginative exploration in the teaching of aerodynamics, emphasizing accessible, simple, low-cost demonstrations for science educators. By examining historical perspectives, studying misconceptions, and fostering problem-solving skills, educators will gain insights into navigating the complexities of aerodynamics education. Attendees will discover practical strategies for integrating critical and creative thinking into their teaching practices, empowering students to understand the principles of flight and

explore innovative solutions. From simple DIY experiments to advanced simulations, this session will showcase a range of hands-on activities designed to illuminate the principles of flight and correct associated misconceptions. Educators will leave empowered with the tools and techniques needed to facilitate engaging and interactive learning experiences, inspiring curiosity, and innovation in their students. Join us on a journey where critical and creating thinking takes flight and learning soars to new heights.
Theme: Critical & Creative Thinking
Primary Audience: All

D14

Cultivating a Questioning Classroom
Dr. Charlotte Pezaro & Dr. Natalie McKirdy, Dialogic Education Services (Qld)
Children ask a lot of questions! In this workshop, we will explore the different kinds of questions children (and adolescents) ask and explain how we can best respond to support their development of ideas about science. We will unpack strategies to facilitate children's questions in ways that enable student-led inquiry and cultivate a questioning classroom.
Theme: Critical & Creative Thinking
Primary Audience: K-10

D15

Engaging Science with Origami models - Interactive Rat Dissection!
Mrs. Daniela Migliorati, Science Supply Australia & Mrs. Marcia Rogerson, CREST Education (Vic)
In this hands-on workshop we will discover an alternative to real life rat dissection with our engaging Origami model! There has been much concern about the ethical considerations of using animals in teaching. In this workshop we move away from "live experimentation" to an interactive workshop. Learning through fun is the key to students retaining information as all students learn differently! Origami models are a diverse and interesting way to teach topics in the classroom All material will be provided in the session.
Theme: Sustainability
Primary Audience: Laboratory Technician

D16

Fighting the Bee Bug
Mrs. Nicolette Wheaton, The Glennie School (Qld)
European Honeybees are vital to agriculture in Australia. There is one parasite that threatens to decimate bee populations. Innovation and creativity in STEM are required to reduce the risk of this parasite coming to Queensland and to ensure that our agricultural industry is ready if it does arrive. This workshop provides teachers with a hands-on resource, that demonstrates the use of Project Zero Thinking Routines and Language use, strategies for summarising research findings with students and methods for engaging students in creative and innovative thinking. Teachers will be immersed in this task themselves and have access to slides, assessment scaffold and strategies to immediately implement this into their classrooms. Suitable pedagogy and resources for Years 5 - 10.
Theme: Critical & Creative Thinking
Primary Audience: Year 7-8

D17

Questacon's Cyber Castle Challenge: Using Minecraft Education to teach digital technologies.

Mr. Jeremy Ram, Questacon (ACT)
Defend your castle and protect your chickens from rogue foxes while developing the 21st century skills needed for a potential career in cyber security. Questacon's Cyber Castle Challenge is a fun and engaging resource for teaching principles of cyber security in your classroom. The challenge allows students to independently explore fundamental concepts in cyber security and enables teachers to teach and assess student learning against the Digital Technologies Australian Curriculum. Through open ended exploration on the Minecraft Education platform, the game encourages problem solving, resilience, teamwork and communication and helps students to build these skills collaboratively in the classroom. This interactive session will provide attendees with the resources and experience needed to easily use the Cyber Castle Challenge with your students. Participants will put on their student hats and undertake the challenge working in small teams, under the guidance of Questacon's Cyber Program facilitators.
Theme: Interdisciplinary
Primary Audience: K-6

D18
Climate aware, not climate afraid.
Ms. Elke Barczak & Ms. Priscilla Gaff, Museums Victoria (Vic)
Discussing climate change with primary and lower secondary students can be challenging. Recent research Australian research highlights an alarming trend of declining mental health in young people in response to climate concerns. At the same time, understanding climate change science is of fundamental importance, and features strongly through the Australian Curriculum in topics such as Earth's change over time, chemical reactions, the physics of heat exchange and human impacts on natural systems. In this conversation, sensitive approaches to climate science education will be explored, with hands-on elements and case-studies from Melbourne Museums programs and exhibitions.
Theme: Climate Education
Primary Audience: Year 7-8

D19
Riding the Climate Rollercoaster
Mr. Glen Nash, Teacher Earth Science Education Programme (Vic)
Over the last 4.6 billion years, the Earth has experienced extreme variations in climate, including more recent human-induced climate change. TESEP's professional development workshop explores climate change throughout geological time and discusses the impact climate fluctuations have had in the past as revealed by the rock record. Our workshop examines the drivers of climate change – such as plate tectonics, volcanism, planetary and galactic events, and looks at the environments different rocks are deposited in, and what fossils can tell us about climate conditions. The workshop also examines the additional impact human activity is thought to have and the geological evidence for it and provides guidance on how teachers and students can access raw data to evaluate the results for themselves. The content is directly relevant to the Stage 5 curriculum to senior secondary.
Theme: Climate Education
Primary Audience: Year 9-10

D20
Using food science to stimulate student engagement in the Qld applied sciences.
Mrs. Valma Cahill & Mr. Fletcher Christian, Harristown State High School (Qld)
The Queensland Curriculum and Assessment Authority have implemented new syllabuses in the Applied Sciences. These require students to produce a product or demonstrate a skill as one of their assessment tasks. To improve student engagement, we have sought to incorporate the use

of food science in the curriculum. This presentation will outline how making camembert, honey, ginger beer, and ice-cream can engage students and improve learning outcomes. Come and make ice-cream with us!
Theme: Teaching Science in the Future
Primary Audience: Year 11-12

D21

Capturing Curiosity in the Primary Science Classroom
Ms. Angela White, Eltham Primary School (Vic)
Curiosity is a powerful tool for everyday learning. How can we best harness the natural curiosity of students and help them become critical thinkers and problem solvers? This workshop aims to spark ideas, mostly for primary years, to generate engaging science lessons/units. Primary teachers are especially encouraged to attend to build connections with others and share favourite activities and resources. Early secondary could also benefit from this network of sharing. As an experienced primary science teacher, I have some successful units to share, all adapted from online sources. Save time trawling the internet by sharing favourite sites.
Theme: Teaching Science in the Future
Primary Audience: K-6

D22

My favourite classroom demonstrations
Mr. Mick Moylan, University of Melbourne (Vic)
Demonstrations can be the most exciting and engaging part of chemistry teaching, but it can be difficult (and even nerve wracking) to perform a demonstration for the first time. This presentation will run through some of Mick's favourite demonstrations that are used to create memorable teaching moments, illustrate concepts, attract students' attention, and stimulate classes. The session will show lots of these demonstrations for chemistry in middle and upper secondary school, complete with notes, hints, safety information and suggested suppliers.
Theme: Teaching Science in the Future
Primary Audience: Year 9-10

D23

Astronomy Activities That Will Blow Your Students' Minds
Mr. Spiro Liacos, Cheltenham Secondary College (Vic)
How big are the other planets compared to Earth? How far away are they from the Sun? In this session, I will take you through some fun and engaging practical activities that you can do with your students that will help them to get a feeling for the vast scale of the solar system!
Theme: Teaching Science in the Future
Primary Audience: Year 7-8

D24

Developing metacognition through scientific investigations
Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)
For our students to develop the scientific knowledge and skills that will shape tomorrow, it is imperative that we support them to become effective in managing their learning. This workshop will unpack evidence-informed approaches to building students metacognitive knowledge and skills when undertaking scientific investigations, including scaffolded release of responsibility; use of questioning to explore and test possibilities; cycles of planning-monitoring-evaluation; and worked examples.
Theme: Critical & Creative Thinking

Primary Audience: Year 7-8

D25

Empowering Tomorrow: Recognizing the Crucial Role of School Science Technicians in Science Education

Ms. Jasmina Hazrolaj, Wenona School (NSW)

In this presentation, "Empowering Tomorrow," we focus on the vital role of school science technicians often overlooked in science education. While teachers receive recognition, we shed light on the technicians who work behind the scenes, ensuring labs are ready and safe. Despite their importance, technicians face challenges like limited resources and training opportunities. The talk advocates for acknowledging their contributions and encourages collaboration between educators and technicians for an improved science learning environment. By sharing success stories and suggesting ways to support these unsung heroes, we aim to raise awareness about their crucial role in shaping the future of science education. Let's work together to appreciate and integrate school science technicians into the broader educational conversation.

Theme: Teaching Science in the Future

Primary Audience: Laboratory Technician

WORKSHOP ABSTRACTS (STREAM E)
TUESDAY 9 JULY

E1
Exploring Resources for Integrating Cultural Knowledge in the Chemistry Classroom
Dr. Emily Rochette, University of Melbourne (Vic)

E2
Clues from the brain of an Autistic ADHDer explain how to engage ALL your students when teaching STEM.
Dr. Lorien Parker, Scienceplay Kids (Vic)

E3
Connecting the Dots: Integrating STEM Across Disciplines
Mrs. Claire Hughes, University of Adelaide (SA)

E4
Awesome hands-on demonstrations: a cross-curricular Earth science perspective on STEM teaching
Mr. Joe Fayle, Geoscience Australia (ACT)

E5
Capturing the Cosmos: Astronomy as a gateway for interdisciplinary teaching and learning
Dr. Michael Fitzgerald & Dr. Saeed Salimpour, Deakin University (Vic)

E6
Using the LIA (Launch, Inquire, Act) Framework to provide depth in science and STEM inquiry.
Ms. Helen Silvester, Australian Academy of Science & Prof. Russell Tytler, Deakin University (Vic)

E7
Day 1 in a self-paced, mastery-based classroom: A student's perspective
Mrs. Rachel Peach, Inaburra School (NSW)

E8
Astronomy as a Context for Data Science with your Students
Mr. Robert Hollow, CSIRO Space and Astronomy (NSW)

E9
Experience the Modern STEM Classroom through Gamifying Earth Science
Ms. Suzy Urbaniak OAM & Mr. Jett Coletti, CoRE Learning Foundation (WA)

E10
Constructing meaning using assessments to promote learning in science.
Dr. Sham Nair, Department of Education (NSW)

E11
Questacon's Cyber Team Red: Using tabletop gameplay to explore cyber security careers and skills.
Mr. Lachlan Agett, Questacon (ACT)

E12
Shaping Tomorrow's Scientists: Uncovering the Unseen with Australian Ingenuity
Ms. Jackie Bondell, University of Melbourne (Vic)

E13
Flights of Fancy: Critical and Creative Thinking in Aerodynamics Education
Dr. Graham Wild, University of NSW (NSW)

E14
Cultivating a Questioning Classroom
Dr. Charlotte Pezaro & Dr. Natalie McKirdy, Dialogic Education Services (Qld)

E15
Engaging Science with Origami models - Interactive Rat Dissection!
Mrs. Daniela Migliorati, Science Supply Australia & Mrs. Marcia Rogerson, CREST Education (Vic)

E16
Fighting the Bee Bug
Mrs. Nicolette Wheaton, The Glennie School (Qld)

E17
Empowering Educators: Tools for Inclusive Science Teaching and Learning
Ms. Dimple Bhardwaj & Ms. Lorena Pellone-Gismondi, Victorian Academy of Teaching and Leadership (Vic)
We will begin the session with a story to represent common misconceptions that students have in science. We will discuss how the story can enhance instructional practice of teachers and build students' critical thinking skills. Following this, participants will engage in a hands-on activity designed to encourage diverse expressions of understanding among teachers. Through this activity, we will explore various modes of communication and expression to accommodate diverse learning styles and abilities. Drawing upon the Universal Design for Learning framework, we will critically evaluate the effectiveness of the activity in promoting inclusive science education. By leveraging multiple means of representation, action and expression, and engagement, we aim to equip educators with practical strategies to create inclusive learning environments. This workshop will be aligned to levels 3-9 (Victorian Curriculum).
Theme: Teaching Science in the Future
Primary Audience: Year 7-8

E18
Fuel cells in the Junior and Senior Science Curriculum
Miss. Jelena Edhouse, Oakey State High School (Qld)
As educators we are shaping our students' knowledge of how renewable energies work and informing our students of future careers in the growing Hydrogen Industry. The Australian

Government's ambition is to become a superpower in renewable energy and therefore our current students will be tomorrow's workforce. This workshop will go over how to use Hydrogen Horizon's resources within the Junior (V9AC) or Senior Australian Chemistry curriculum. You will get to use four of the Hydrogen Horizon fuel cells within this workshop – 2 different hydrogen fuel cells, salt cell, bioenergy cell and the thermal energy.
Theme: Sustainability
Primary Audience: Year 9-10

E19

Bringing harmony into Science and Physics through First Nations Perspectives
Mrs. Lisa Moloney, Connecting with Country (Vic)
This year's NAIDOC theme "Keep the Fire Burning. Blak, Loud and Proud" invites us to showcase and celebrate the contributions of First Nations Peoples, their culture, and knowledges. By making space in our science classrooms for First Nations perspectives, voice, and knowledges we can start to decolonise our curriculum one lesson at a time. This session will explore how making music can create harmony in our classroom and showcase First Nations music makers. Lots of great ideas and resources that you can take back to your classroom for 7 to 10 Science and Physics.
Theme: Indigenous Perspectives
Primary Audience: Secondary

E20

Utilizing an 'industrial case study' for chemistry education within the context of 'soap' and related industries
Dr. Mohammad Chowdhury, St. Francis Xavier College (Vic)
The use of industrial case studies can be a powerful method to engage students at the higher secondary or undergraduate level. It enhances their understanding of chemistry concepts and real-world applications. This approach focuses on student-centred and inquiry-based learning. In this presentation, I will delve into a proposed model1 for a case study centred around 'soap and allied industries.' This holistic approach to learning chemistry allows students to explore the interdependence of various industries related to the model. They will learn about the chemistries involved in raw materials, products, and byproducts such as fats/oils, soap, caustic soda, and glycerol. Additionally, I will discuss the implications of sustainable development, which contribute to improving the circular economy. Furthermore, I will demonstrate how the exploration of industrial case studies can serve as a motivational tool, enhancing students' engagement in chemistry learning. By applying their knowledge to real-life situations, students develop problem-solving and decision-making abilities, preparing them to be informed citizens of the future.
Theme: Teaching Science in the Future
Primary Audience: Science Education Research

E21

Harnessing the Power of Technology in the Science Classroom
Mrs. Kelly Hollis & Mr. John Davison, Education Perfect (NSW & Vic)
Teaching science demands a mix of curriculum content and effective pedagogy. With the advent of tech in education, educators seek ways to seamlessly weave it into their teaching. Integrating technology isn't just about keeping up with the times; it's a game-changer for creating lively, interactive face-to-face learning environments. Technology provides the tools to transform the classroom into a space of wonder and awe for students. Witness the metamorphosis from basic task substitution to the extraordinary realm of redefining learning experiences as we explore the SAMR model and see the potential of 'substitution,' 'augmentation,' 'modification,' and 'redefinition,' to empower educators to soar beyond the mundane. Understanding how to harness

technology is the first step towards creating active and engaging classrooms for your students. In this session, we will explore a number of technology tools, including content creation, formative assessment and a range of AI tools that can be used for student projects. Each teacher will walk away with ideas they can implement with their students the next day.
Theme: Teaching Science in the Future
Primary Audience: Year 7-8

E22
How to best organise and manage student-designed investigations.
Mr. James Crisp, RiskAssess & Mr Philip Crisp, Ecosolve (NSW)
Come and gain ideas on how to effectively organise and manage thirty (or many more) students simultaneously conducting student-designed practical investigations in Stages 4, 5 or 6. We will also offer ideas for experiments based on de-identified information from more than 550 schools using the Student RiskAssess software. Student RiskAssess helps students design their own experiments more independently by assisting them to identify risks and consider other matters such as control measures, saving time for the teacher. Also, the software provides easy management of experiments and risk assessments by teachers, and quick compilation of order requests, speeding up the work of lab techs. The new 'multiple prac management' system allows teachers and lab techs to efficiently provide feedback, review and sign off on large numbers of student pracs in one go.
Theme: Education for All
Primary Audience: Secondary

Demonstration Derby 1

E23
Adopting ocean literacy into the classroom to enable a sustainable world.
Dr. Prue Francis & Dr. Cátia Freitas, Deakin University (Vic)
This session will define ocean literacy and outline why it is essential to enabling a sustainable world. We will also showcase our freely available teacher's guide that can be used to implement ocean literacy at the primary school level and show the impact of this resource from schools who have implemented the guide in their school curriculum.
Theme: Sustainability
Primary Audience: K-6

Re-engaging high school girls in STEM
Mr. Christopher Brunner, Sydney Secondary College – Balmain Campus (NSW)
Sydney Secondary College Balmain Campus has run the iSTEM Elective since 2018 with an average of 7 girls (20% of total students) choosing the elective each year. In 2024 we have 30 girls (45%) enrolled in iSTEM. This talk will outline our story - how we re-invented our approach to STEM at SSCBC with a multi-pronged strategy involving a partnership with UTS WiEIT, a Girls STEM Club and redesigned electives. (Year 7-10)
Theme: Education for All
Primary Audience: Year 9-10

Introducing First Nations perspectives into your Primary Science classroom
Mrs. Lisa Moloney, Connecting with Country (Vic)
This session covers some of the great resources for teaching First Nations perspectives in your Secondary Science classroom and ways of introducing First Nation's voice.
Theme: Indigenous Perspectives

Primary Audience: K-12

Diversity in STEM Collective - Engaging with Universities across Australia
Miss Tara Graves, RMIT University (Vic) & Miss Tayla Allison, University of Adelaide (SA)
The Diversity in STEM Community of Practice started as a collaboration between three universities across Australia: RMIT University, University of Technology and University of Adelaide. This session aims to highlight achievements of the collective, the evidence behind multi-touch outreach programs & teachers' confidence in STEM and provide you with opportunities to engage with university outreach un your region. We will share our project directions and how teachers can benefit from, and be involved in, the collective. School outreach activities and measures are designed to increase participation from students who have traditionally been underrepresented in STEM education and careers. These practical programs provide school students, parents and community groups with practical STEM experiences and foster equal access to further education.
Theme: Education for All
Primary Audience: K-12

PhysChemTechTrainer as a learning aid for Senior Secondary Physics
Mr. Tino Delbourgo, Don College (Tas)
This presentation introduces "PhysChemTechTrainer" which is an online practice website developed by the presenter for senior secondary physics teachers and students (with the intention of including chemistry topics in the future). The website produces individualised questions with millions of small variations together with fully worked solutions. Tasmanian students have used it to gain fluency in solving a range of physics problems and many of these questions are applicable to physics curricula in other states and territories. This short presentation will cover the basics of how to use the system and how it has successfully assisted students as a tool to incorporate into a varied, future-focused science teaching programme. Please note this is not a commercial presentation - the system is totally free for any student or teacher to access with no login required and no personal details held.
Theme: Teaching Science in the Future
Primary Audience: Year 11-12

WORKSHOP ABSTRACTS (ASTA WORKSHOPS & STREAM F) - WEDNESDAY 10 JULY

F1
ASTA Workshop: What are the key purposes of science education?
Theme: ASTA Forum
Primary Audience All

F2
ASTA Workshop: What image of "science" should we promote?
Theme: ASTA Forum
Primary Audience All

F3
ASTA Workshop: What ethics and values should be promoted in school science?
Theme: ASTA Forum
Primary Audience All

F4
ASTA Workshop: How can critical thinking about science in society be promoted?
Theme: ASTA Forum
Primary Audience All

F5
ASTA Workshop: How can we ensure equity in science education?
Theme: ASTA Forum
Primary Audience All

F6
ASTA Workshop: How can school science develop futures thinking?
Theme: ASTA Forum
Primary Audience All

F7
ASTA Workshop: What are the key challenges for science education in the 21st century?
Theme: ASTA Forum
Primary Audience All

WORKSHOP ABSTRACTS (STREAM G)
WEDNESDAY 10 JULY

G1

Magic and hydraulic dinosaurs

Mr. Peter Razos, Caufield Grammar (Vic)

The need to engage students Science and STEAM is even more relevant now than ever before. This workshop will demonstrate the building of hydraulic dinosaurs and the teaching Science through Magic, Sport, and Kitchen Science just to name a few. All resources are free, and participants will explore how their science lessons can change to be vibrant and engaging. Participants are encouraged to bring their own device to get a better experience in using the resources. If you are teacher of Chemistry, you will love the free resources attached to the Chemistry Unit. Below is a link to the Science of Sport unit just to show you how the resources can be placed in your own timeline to suit your teaching calendar. This workshop is suitable for all teachers of science.

http://www.dynamicscience.com.au/tester/solutions1/biology/spotsmedicine/timeline.htm

Theme: Education for All

Primary Audience: Year 7-8

G2

A Healthy Land – Measuring the environment with Vernier dataloggers.

Mr. Stuart Lewis, Scientrific (ACT)

The natural world is made-up of many complex systems that connect together. This workshop will look at using datalogging to measure various environmental conditions in plants, the soil and water.

- Looking at chlorophyl in plants
- Investigating plant photosynthesis
- Investigating respiration
- Abiotic conditions
- Water analysis.

Theme: Education for All

Primary Audience: Year 9-10

G3

Shaping School STEM Diversity with University Support

Ms. Maryam Kausar, University of Technology Sydney (NSW) & Ms. Tara Graves, RMIT University (Vic)

The Diversity in STEM Collective aims to unite school outreach and STEM education practices for impactful national implementation. A collaboration between University Technology of Sydney, RMIT University, and University of Adelaide, the project pulls together best practices from each of these institutions' outreach programs, working across metro and regional schools. Focus ranges from sustained student engagement in multi-touchpoint projects to teacher PD on inclusive STEM linked university opportunities. We invite you to collaborate for enhanced student-focused university and school partnerships across Australia. Join this workshop to explore how universities can support primary and high school teachers to increase participation from students who have traditionally been underrepresented in STEM education and careers. This session will focus on the co-design of outreach activities between universities and schools, with opportunities for your school to engage with Collective activities.

Theme: Education for All

Primary Audience: K-12

G4

Seamlessly incorporating STEM activities into your classroom practice.

Dr. Lucy Cassar, St Francis Catholic College (Vic) & Ms. Catherine Bellair, Thomas Carr College (Vic)

STEM activities often happen outside the normal Science, Maths or Technology curriculum as special events. However, many STEM activities can easily be integrated with the curriculum being taught in your classroom and become part of your teaching program. This workshop aims to provide you with ideas for incorporating STEM activities into your classes on a regular basis and the skills to modify STEM activities to ensure they meet the requirements of your curriculum, including assessment. While the focus will be on STEM in the Science classroom, the ideas and skills covered are easily transferrable to a Maths or Technology classroom or cross curricular environment.

Theme: Interdisciplinary

Primary Audience: Year 7-8

G5

Teaching bioethics in senior biology using guided inquiry: A study with teachers as co-researchers.

Mrs. Amrita Kamath, Deakin University (Vic)

Bioethics is an integral part of scientific research, and this concept has gained a renewed focus in the updated senior secondary biology study design in Victoria. In this presentation I share findings of my PhD study where I worked with teachers to explore ways to effectively embed guided inquiry-based pedagogical strategies into teaching and learning of bioethics. Four teachers from three schools, all with different contexts, participated as co-researchers. An eight-lesson sequence (which will be shared in the presentation) was collaboratively and iteratively adapted to suit varied learning situations, factoring in student voice. Teachers implemented the interventions with their year 11 cohorts, and data was collected during the process through teacher and student interviews, classroom videos and student work. Findings revealed insights into teacher decision making and variation in response to context which can be used to enhance learning, inform future studies, and design of professional learning sessions.

Theme: Teaching Science in the Future

Primary Audience: Year 11-12

G6

Understanding and applying collaborative AI into the classroom: Moving from FEAR to FOMO (Fear of Missing Out)

Mr. Raj Burli, CSIRO (Vic)

Recent developments in generative AI have been a significant disruptor and catalyst for change across the education sector. The launch of ChatGPT, Gemini and other AI-enabled chatbot tools have challenged traditional ways of teaching and raised concerns about privacy, plagiarism, and cheating. Additionally, Science Educators are keen to understand how these tools should be integrated into contemporary teaching practices, and the skills and capabilities that will be required to work collaboratively with AI in the classroom. This presentation will explore how Science Educators can build capability and inclusive knowledge sharing to ensure that all Australian schools stay abreast of best practice and learnings. Co-presented by CSIRO Education and The Human and Machines Group in CSIRO's Data61, insights will be shared on the calibration of trust in AI, and how to leverage the complementary strengths of human and AI.

Theme: Interdisciplinary

Primary Audience: K-12

G7

Science at work in civil engineering and construction

Mr. Michael Rosenbrock, Michael Rosenbrock Education (Vic)

The science that students explore during secondary school has many applications in STEM industries such as civil engineering and construction. This session will share examples of specific contexts related to road, rail and public works that are linked to areas of the curriculum, including teaching and learning materials that are freely available for educators to use.

Theme: Interdisciplinary

Primary Audience: Year 7-8

G8

The Story of Mungo Man 50 years on

Mrs. Lisa Moloney, Connecting with Country (Vic)

50 years ago, Mungo Man made his way to the surface and revealed himself to Professor Jim Bowler, a geologist, looking for evidence of climate change and the last ice age. These human remains (as well as Mungo Lady five years before) retold the history of First Nations People in Australia and are of international significance. The story of Mungo Man and Mungo Lady, and their message, is still as important now as it was when they come to the surface over 50 years ago. This session will explore how science can be used to experience what life was like over 42,000 years ago and the changes that can inform our future and humanity.

Theme: Indigenous Perspectives

Primary Audience: K-12

G9

How to best organise and manage student-designed investigations.

Mr. James Crisp, RiskAssess & Dr. Phillip Crisp, Ecosolve (NSW)

Come and gain ideas on how to effectively organise and manage thirty (or many more) students simultaneously conducting student-designed practical investigations in Stages 4, 5 or 6. We will also offer ideas for experiments based on de-identified information from more than 550 schools using the Student RiskAssess software. Student RiskAssess helps students design their own experiments more independently by assisting them to identify risks and consider other matters such as control measures, saving time for the teacher. Also, the software provides easy management of experiments and risk assessments by teachers, and quick compilation of order requests, speeding up the work of lab techs. The new 'multiple prac management' system allows teachers and lab techs to efficiently provide feedback, review and sign off on large numbers of student pracs in one go.

Theme: Education for All

Primary Audience: Laboratory Technician

G10

Australia's first Forest Science Explorers teacher toolkit – A Virtual Field Experience (VFE)

Ms. Beth Welden & Ms. Kaz Standish, Forest and Wood Products Australia (Qld)

Have you been wanting to explore more sustainability concepts with your students using real world applications? Imagine your students uncovering the mysteries of Australian forests from the classroom & beyond! Join us to explore the transformative power of Virtual Fieldwork Experiences (VFEs), enabling students to engage with remote locations like never before. Discover and be equipped with a new VFE - the Forest Science Explorers toolkit – collaboratively developed by ForestLearning and the Australian Science Teachers Association, aligned with the Australian Curriculum v9.0 Years 5-6 Science yet adaptable for lower secondary. In this workshop:

• Integrate VFEs with education award winning ForestVR™ 360-degree experiences & virtual

tours.
• Learn how to engage your students in Australia's diverse forest types, unique tree adaptations and life cycles.
• Take away inquiry-based teaching units - student workbooks, teacher resources, practical tools & more!
• Enrich student learning with cross-curricular connections including 'Sustainability'.
• Discover more science teaching tools for primary and secondary science classrooms developed by ForestLearning!
Don't miss this opportunity to learn how to shape the future of science education in your classroom!
Theme: Sustainability
Primary Audience: K-6

G11

Chemistry of Critical Minerals – Sustainable, Climate-safe Energy
Mr. Glen Nash, Teacher Earth Science Education Programme (Vic)
An energy system powered by clean energy technologies differs profoundly from one fuelled by traditional hydrocarbon resources. Building solar photovoltaic (PV) plants, wind farms and electric vehicles (EVs) generally requires more minerals than their fossil fuel-based counterparts. [A typical electric car requires six times the mineral inputs of a conventional car, and an onshore wind plant requires nine times more mineral resources than a gas-fired power plant]. Since 2010, the average amount of minerals needed for a new unit of power generation capacity has increased by 50% as the share of renewables has risen. Critical minerals are minerals deemed to be economically important and have a high risk of supply disruption. Many of the minerals deemed critical underpin our energy transition to Net Zero by 2050, and our increasingly high-tech society. The formation and location of critical minerals is fundamentally linked to plate tectonics and the rock cycle. TESEP's workshop examines the geochemistry of the mantle and the crust, controls on mineral formation like temperature and pressure, and why economic and critical minerals only form in certain geological conditions. This workshop explores how the physical and chemical properties of critical and other minerals provide resources for humans, including for First Nations Australians. The topic also explores critical minerals in Australia, including geopolitical risks, advances and challenges in recycling minerals, and current projects. Content is relevant to Stage 2 curriculum to senior secondary with chemistry, physics, and STEM crossover.
Theme: Sustainability
Primary Audience: Year 9-10

G12

Climate Change Education Forum- hearing from secondary school students on the future of climate change education
Ms. Ellie Hansford, Sustainability Victoria (Vic)
Centre for Regenerating Futures and ResourceSmart Schools Program are working together to deliver a Climate Change Education Forum in early May 2024. The forum is an attempt to better prepare secondary school students, through hearing from them and their understandings of what they know about climate change and its impact on them and their world. This is a key action in the Adaptation Action Plan for the Education and Training sector, coordinated by the Department of Education. The forum will be centred around intergenerational conversations about the future with adult leaders hearing from young people on how they'd like to be included in future planning, implementation, and evaluation of climate change learning, along with any ideas young people

might have regarding health, wellbeing, inclusion, and the most engaging learning and teaching resources for the future of climate change education.
Theme: Climate Education
Primary Audience: Science Education Research

G13
Using data and numeracy skills in the classroom
Mr. Wayne Sandlant, Somerville Secondary College (Vic)
As a growing concern has been the role numeracy and literacy play in students understanding in the classroom our team has look at how we can create engaging activities to support students from these blockers. During this presentation you will see some lesson starters, activities, and links between departments to support teachers in using numeracy in the classroom. We will also look at how numeracy skills appear in VCE across all science domains, highlighting key components.
Theme: Interdisciplinary
Primary Audience: Year 9-10

G14
Score Big with STEM
Miss. Sophie Stewart & Mrs. Emily O'Halloran, The Huddle (Vic)
Step into the world of "Sporty STEM" and revolutionize your classroom engagement! This workshop, "Score Big with STEM" unveils dynamic STEM resources crafted for students at levels 3 to 8. Dive into the thrill of sport and play as catalysts for enhanced student engagement. All showcased resources are freely accessible, promising an instant infusion of excitement into STEM classrooms nationwide. Educators will experiment with soccer, basketball, football and AFL games and challenges to test how these activities ignite curiosity, wonder, and critical thinking. This session is your ticket to infusing STEM with fun, guaranteeing to make it accessible and impactful. Join us in redefining the learning game, ensuring students not only score academically but also revel in the joys of discovery and learning. Get ready to play, learn, and score big in STEM!
Theme: Critical & Creative Thinking
Primary Audience: K-6

G15
Shaping the Innovators of the Future
Ms. Libby Moore, Moore Educational (Vic)
The LEGO Learning System helps spark an interest in science from Foundation to Secondary school with hands-on minds-on activities that provide an understanding of physical science concepts. Working with robotics also, engages students of all levels in scientific methods and practices, such as observation, experimentation, data collection and analysis along with coding and computational thinking skills that will shape the innovative minds of the future. This session will explore how this complete hands-on STEM learning tool aligns with the Australian National Curriculum and supports teachers in making Science fun! To continue the playful learning, take away a sample LEGO Education set and lesson to try it out with your students.
Theme: Critical & Creative Thinking
Primary Audience: K-6

G16
Electricity: The Shocking Truth
Mr. Spiro Liacos, Cheltenham Secondary College (Vic)

How do engineers achieve the extraordinary feat of wiring up a car's electrical circuitry so that the same courtesy light turns on regardless of which door you open? This session will give you ideas (and actual prac sheets and worksheets) that will allow your students to learn all the basics of electricity and to design and construct a variety of electrical circuits that satisfy a range of design briefs. Currently, this series of pracs is without parallel. Ohm my goodness, I couldn't resist including a battery of puns, but I will conductor powerful session with ample opportunities for you to learn watts of stuff that will transform your classes and generator lot of ideas!
Theme: Critical & Creative Thinking
Primary Audience: Year 9-10

G17

A representation construction pedagogy that transcends the inquiry-explicit teaching binary

Prof. Russell Tytler & Prof. Vaughan Prain, Deakin University (Vic)
In this presentation we describe a pedagogy developed through two decades of research into the multimodal nature of science knowledge and practice, applied to interdisciplinary mathematics and science research in primary school (https://imslearning.org/). The project has been successful in developing students' science and mathematics knowledge beyond expectations, and teachers have attested to the engagement of students in a process of creating and refining visual and mathematical representations based on practical explorations. We argue that this approach goes beyond the unproductive 'explicit teaching vs inquiry' debate by showing how teachers can use both approaches to orient students' representational work strategically in material investigation, and guided consensus, to establish conceptual knowledge and immersion in scientific practices. In the session we will discuss principles underpinning the stages of the pedagogy, teaching strategies and challenges, and the extended nature of outcomes flowing from the approach.
Theme: Critical & Creative Thinking
Primary Audience: Science Education Research

G18

Conservation science in schools

Mr. Christopher Vella, Zoos Victoria (Vic)
The Fighting Extinction Schools program has allowed teachers and their students across Victoria to engage with authentic conservation science for over ten years. From restoring the habitat for critically endangered Golden-rayed Blue Butterflies to collecting citizen science data to aid in conserving Mountain Pygmy Possums, this session will showcase free resources and support so you can bring contemporary conservation science into your classroom.
Theme: Interdisciplinary
Primary Audience: K-12

G19

Big Data in Science – Creating a Year 10 Elective Class

Mr. David Henry, St. Mary MacKillop College (ACT)
We designed an elective for year 10 students where they learn to find, clean up and analyse large scientific data sets. It has helped to give students an extra stepping stone into Senior Science courses. The course takes students from basic spreadsheet skills through to using algorithms to find and communicate the meaning hidden in sets with thousands of data points (and in their own experiments). In this session we take you through the design choices and challenges we faced in making the course accessible to students with a wide range of abilities, including how to turn raw astronomical and chemistry data into learning resources and how the assessment was refined to help scaffold student work, while also allowing deep creative and

original thinking. Examples of learning resources, data sets and assessment questions are included.
Theme: Critical & Creative Thinking
Primary Audience: Year 9-10

G20

Designing lesson plans for interdisciplinary citizen science in schools: bridging biodiversity and public health

Dr Larissa Braz Sousa, University of Sydney (NSW)

Curriculum alignment and resource availability pose challenges for school-based citizen science implementation. The Learning by Doing (LBD) research project tackles these issues by addressing key challenges in implementing citizen science, focusing on developing curriculum-aligned resources. Two tailored K-6 projects, 'Mozzie Monitors' and 'Citizen Science BioBlitz', utilise mosquito traps and the iNaturalist platform to engage students in real-world science. Aligned with the Australian curriculum, our lesson plans cover life cycles, features, behaviours, taxonomy, ecology, human health, and geographic scales. Students actively contribute to scientific knowledge, monitoring species diversity (BioBlitz), capturing mosquitoes (Mozzie Monitors), and understanding the role of citizen scientists on iNaturalist. Acquired skills extend to other citizen science projects like the Australian Pollinator Count, Aussie Bird Count, City Nature Challenge, and Great Southern BioBlitz, empowering students to apply knowledge across diverse projects throughout the year. These initiatives offer educators easily operated, readily available, and curriculum-aligned resources for engaging students in real-world science.
Theme: Teaching Science in the Future
Primary Audience: K-6

Demonstration Derby 2

G21

The Plant Science Learning Hub - innovation and outreach on a national level at the Australian National Botanic Gardens

Mrs. Sally Ingham, Australian National Botanic Gardens (ACT)

The Australian National Botanic Gardens is committed to inspiring students across Australia. The Gardens have developed a robust and engaging education hub that encourages a culture of curiosity and empowers science educators to confidently teach plant science and shape tomorrow's scientists. Developed by the Garden's scientists and educators, the Plant Science Learning Hub uses Australia's unique plants and stories to provide a complete learning journey through plant science from Plant Life Cycles to Ecosystems. The Hub uses experiential and inquiry-based learning techniques to provide students and educators with a robust suite of lesson plans, outdoor activities, videos, educator background notes and online interactive activities. The Hub offers clear links to the Australian Curriculum. In this presentation, the Australian National Botanic Gardens outlines the project development, co-design with educators and scientists, the research behind the decisions and how educators can utilise the Plant Science Learning Hub to inspire their students.
Theme: Education for All
Primary Audience: K-6

Analysing student and class interests for improved differentiation

Dr. Christopher Brunner, Sydney Secondary College – Balmain Campus (NSW)

When we know our students, we are better able to differentiate and create engaging tasks according to their specific interests. However, getting to know our students can take time. Sydney

Secondary College, Balmain Campus surveys students at the start of every year and analyses the data to help staff understand their students and provide valuable information when preparing enriching lessons for their students. This talk will discuss the tool we have developed and and how we use it at our school.
Theme: Education for All
Primary Audience: Year 7-8

Using data and numeracy skills in the classroom
Mr. Wayne Sandlant, Somerville Secondary College (Vic)
As a growing concern has been the role numeracy and literacy plays in students understanding in the classroom our team has look at how we can create engaging activities to support students from these blockers. During this presentation you will see some lesson starters, activities and links between departments to support teachers in using numeracy in the classroom. We will also look at how numeracy skills appears in VCE across all science domains, highlighting key components.
Theme: Interdisciplinary
Primary Audience: Year 9-10

Fostering Innovation in Wildlife Conservation
Miss Francesca Lennie, Zoos Victoria (Vic)
In the realm of wildlife conservation, technological advancements are crucial for safeguarding threatened species. Zoos Victoria uses design thinking to empower students in addressing complex technological challenges faced by our conservation scientists. Through immersive exploration, students analyse existing technologies for wildlife monitoring, understanding their functions, benefits, and limitations. Students generate novel solutions that address the limitations of current technologies, fostering a culture of innovation in conservation. This program not only equips students with essential tools but also inspires educators. Teachers receive a structured framework to integrate real-world challenges into their curriculum, enriching educational experiences. Educators gain access to resources that facilitate the incorporation of design thinking principles, enhancing student engagement and critical thinking, sparking curiosity and critical thinking in students. By empowering teachers to guide students through this experiential learning journey, the program enriches classroom experiences and cultivates a community of educators and students passionate about environmental stewardship and conservation education.
Theme: Teaching Science in the Future
Primary Audience: K-12

Sharing student research – The Journal of Science Extension Research
Mr. Chris Bormann, Department of Education (NSW)
After completing a year-long endeavour in scientific research, Science Extension students produce a Scientific Research Report. It represents a culmination of students' efforts in all aspects of conducting scientific research and communicates their understanding of the scientific process. The science curriculum team at the NSW Department of Education undertook a project to document students', teachers', and mentors' experiences of engaging in this unique Stage 6 science course. In addition, the team developed the Journal of Science Extension Research, an online publication of students' Scientific Research Reports. In this showcase, participants will hear about the purpose of the Journal, including the production processes it entails.
Theme: Teaching Science in the Future
Primary Audience: Year 11-12

Bringing life to Evidence-based teaching when preparing students for Internal Assessments

Dr. Meriet Mikhail, Anglican Church Grammar School (Qld)

Want to improve the quality of student experimental reports or research-based tasks? Demystifying marking guides is a necessary step to ensure equitable opportunities for your students to demonstrate their abilities. In this workshop, you will be guided through best practice approaches to prepare your students for internal assessment, such as scaffolded documents and sample stimuli. You will also gain simple-to-implement methods to reduce cognitive load and improve long-term recall and retention and strategies for "tasking students to show".

Theme: Teaching Science in the Future

Primary Audience: Year 11-12