



Space to Innovate

CONASTA 70 ADELAIDE



9-12 JULY 2023

Conference Handbook



Michael Waterhouse Photography - North Terrace, Adelaide



This program may be subject to change. Version: 28 June

CONASTA 71

7 - 11 JULY 2024

The University of Melbourne, Parkville, Victoria

EXCLUSIVE LAUNCH COMING



STAVscience

Be Our Next Star Teacher



ignite curious minds



To be our next star teacher click on the QR code to express interest in working with Catholic Education South Australia.

Moving allowance and country incentives.

Whether you're a science teacher, school laboratory technician/manager, or anyone with a keen interest in science

education, Catholic Education SA welcomes you with open arms. Join our vibrant community of educators

who are dedicated to fostering a love for science and nurturing the next generation of curious minds.



cesa.catholic.edu.au | connect [#CatholicEducationSA](https://twitter.com/CatholicEducationSA)

Program Outline

CONASTA70

SUNDAY 9 JULY

3.30PM	Welcome to CONASTA 70 at SAHMRI <i>Sponsored by Australian Science Innovations</i>
--------	--



MONDAY 10 JULY

7.15AM	Science Breakfast at the Adelaide Zoo
8.00AM	Registration - Bonython Hall
8.45AM	Conference Opening - Braggs Theatre
9.30AM	KEYNOTE 1: Professor Mary L Droser, Earth and Planetary Sciences, University of California <i>Sponsored by Future You</i>
10.35AM	Morning Tea - Bonython Hall
11.10AM	Cutting Edge Presentations
12.20PM	Lunch - Bonython Hall
1.30PM	Workshop Session 1
2.40PM	Workshop Session 2
3.50PM	ASTA Awards
4.20PM	STANHOPE ORATION: Dr Kristin Alford, Director, MOD. <i>Presenting Partner: Australian Academy of Science</i>
5.30PM	Stanhope Social Event at the SA Museum <i>Sponsored by the South Australian Museum</i>



TUESDAY 11 JULY

8.00AM	Registration - Bonython Hall
8.30AM	Housekeeping - Braggs Theatre
9.00AM	KEYNOTE 2: Professor Christopher Daniels <i>Sponsored by CSIRO</i>
10.00AM	Morning Tea - Bonython Hall
10.40AM	Offsite Excursions & Workshops
1.10PM	Lunch - Bonython Hall
2.20PM	Workshop Session 3
3.30PM	Workshop Session 4 & SETA Forum
4.40PM	Happy Hour <i>sponsored by Stile</i>



7.00PM	Conference Banquet at Adelaide Oval <i>Sponsored by PIEFA</i>
--------	---



WEDNESDAY 12 JULY

8.00AM	Registration - Bonython Hall
8.30AM	Housekeeping - Braggs Theatre
9.00AM	KEYNOTE 3: Professor Tanya Monro, Chief Defence Scientist, Defence Science and Technology Group <i>Sponsored by Questacon</i>
10.00AM	Morning Tea - Bonython Hall
10.40AM	Workshop Session 5
11.50AM	Workshop Session 6
1.00PM	Lunch - Bonython Hall
2.10PM	Workshop Session 7
3.20PM	Conference Closing
3.45PM	Farewell Drinks in the Atrium





Conference Sponsors

CONFERENCE PARTNERS



AUSTRALIAN
SCIENCE
TEACHERS
ASSOCIATION



PLATINUM SPONSOR



Government
of South Australia

Department for Education

GOLD SPONSORS



SILVER SPONSORS



EVENT SPONSORS



Contents

CONASTA 70 Welcome	4
Exhibition Floorplan	5
Exhibitor Listing	6
Social & Networking Opportunities	11
Monday Program	14
Keynote Speaker	14
Cutting Edge Presentations	15
Workshop Outline	18
Workshop Sessions	19
Stanhope Oration	27
Tuesday Program	29
Keynote Speaker	29
Offsite Excursions	30
Workshop Outline	31
Workshop Sessions	32
Wednesday Program	45
Keynote Speaker	45
Workshop Outline	47
Workshop Sessions	49

Each page heading is a link - click on them to be taken directly to that page.

Support our Sponsors

CONASTA 71	0a
Catholic Education	0b
Conference Sponsors	2
Girls in STEM Toolkit	10
The University of Adelaide	13
Bright Education	22
ARC Centre of Excellence for Engineered Quantum Systems	26
PIEFA	30
Stile	44
CSIRO	46
Department for Education	62

CONFERENCE HOST

South Australian Science Teachers Association

Email: office@sasta.asn.au

Website: www.conasta70.com.au

Executive Officer: Kate Dilger

Conference Manager: Tegan McClean



CONFERENCE CONVENOR

Peter Turnbull

CONFERENCE ORGANISING GROUP

Kathleen Best
Sarah Finney
Claire Hughes
Ana Marques Britto
Dina Matheson
Cliff Rothenberg
Stef Sotora
Jane Wright



Michael Waterhouse Photography - Adelaide

Welcome CONASTA70

Dear Colleagues,

It is my honour to welcome you to the 70th annual Conference of the Australian Science Teachers Association (ASTA), CONASTA 70. As the President of ASTA, I am thrilled to be a part of this exceptional event hosted by the South Australian Science Teachers Association (SASTA).

ASTA is a federation of Science Teachers Associations from all Australian States and Territories, representing thousands of teachers across the nation.

CONASTA is ASTA's flagship event, held annually and hosted in rotation by the eight member associations. This year, SASTA has organised an outstanding program that will offer high-quality and stimulating professional learning experiences for science teachers, laboratory technicians, managers, and other stakeholders in science education.

With the University of Adelaide as our host institution, the conference will take place from July 9th to 12th, 2023. This world-class research and higher education institution is located in the heart of Adelaide, one of the world's top 10 most liveable cities.

The theme of this year's conference, The Space to Innovate, will celebrate the innovative culture of continuous learning at all levels of schooling in Australia.

You will have the opportunity to hear from inspiring keynote speakers, participate in unique session formats and informative share-a-thons, and engage in exciting social activities and networking events. The conference will include excursions to cultural, scientific, and health organizations in Adelaide, including the Art Gallery of South Australia, the South Australian Museum, and the Australian Space Discovery Centre.

Additionally, the Trade Display at CONASTA 70 will showcase the latest programs, innovations, products, and services in science education.

I extend my gratitude to the Organising Committee for their dedication and hard work in planning this exceptional event. I also wish to thank SASTA for their hospitality and for hosting the conference on behalf of ASTA.

Thank you for joining us, and for your commitment to science education. I wish you all a productive, engaging, and enjoyable conference!

Sincerely,

Rosemary Anderson



President, Australian Science Teachers Association (ASTA)

A very big welcome to CONASTA 70!

SASTA is very proud to once again be hosting CONASTA, the annual conference of the Australian Science Teachers Association. CONASTA was last held in South Australia with CONASTA 63 in 2014. It is great to once again be back in the CONASTA cycle after several missed years because of the pandemic.

We particularly welcome the many of you who have travelled from other parts of Australia to be here. And we welcome and thank the very many people who are contributing to our conference program.

We have assembled what we believe will be a wonderful conference program, and we very much hope that you will find it stimulating and of great interest.

I would like to thank all of our many sponsors and exhibitors, without whom we could not host a conference such as this. They are all named in the conference materials. In particular I would like to thank the University of Adelaide for their generous in-kind sponsorship that has once again provided our conference venue. Thank you.

Thanks also to the many people who have contributed to the conference planning. These include the members of our SASTA Conference Organising Group. In particular I thank the wonderful staff of the SASTA office who have undertaken so much of the conference organisation and planning. A very big thanks!

I wish everyone a wonderful conference experience. Welcome to CONASTA 70!

Peter Turnbull

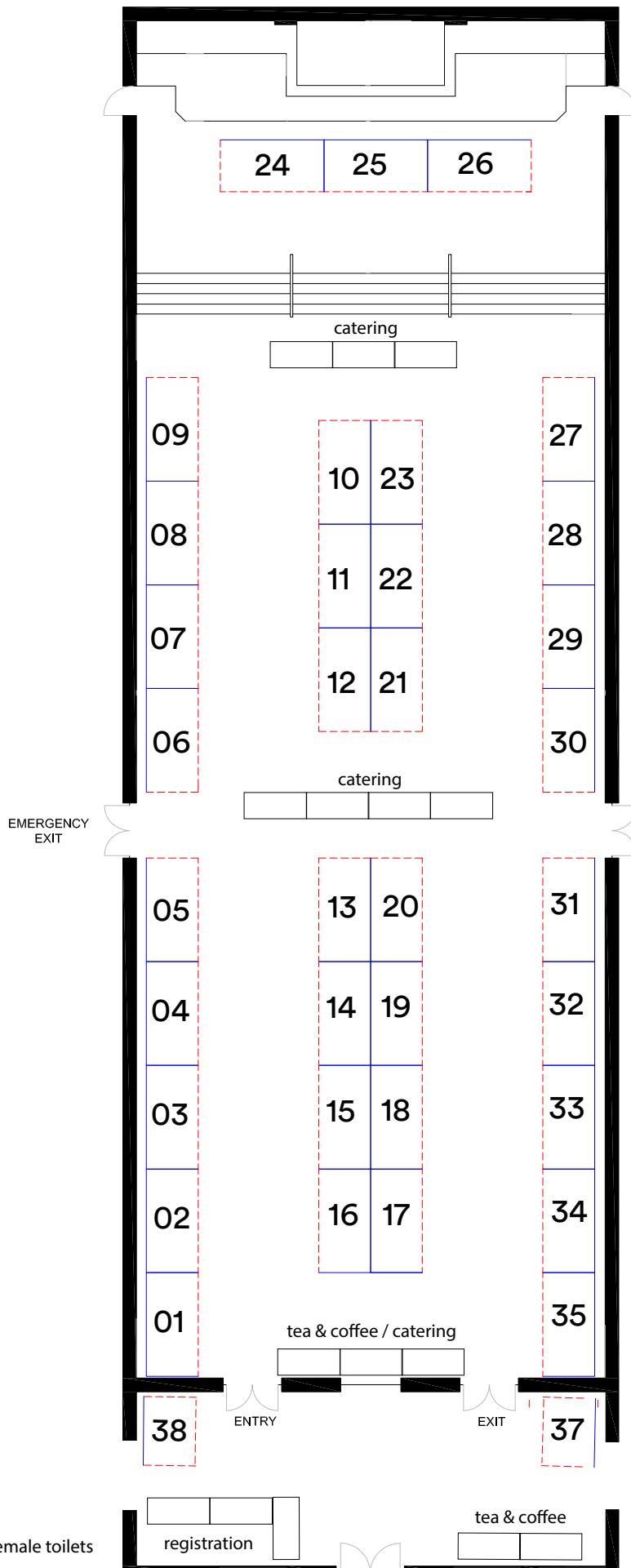


Convenor, CONASTA 70

Exhibition - Bonython Hall

PIEFA Marquee

Goodman
Crescent
Lawns



1 & 2	CSIRO
3 & 4	Centres of Excellence: Quantum to the Cosmos
5	ARC Centre of Excellence for Engineered Quantum Systems
6	Scientrific - Vernier
7	Pearson Australia
8	Royal Australian Chemical Institute
9	Arludo
10 & 11	The University of Adelaide
12	Energy, Mining & Resources School Outreach Program
13 & 14	Nelson
15	Education Perfect
16	Atomi
17	Modern Teaching Aids - MTA
18	Canberra the Science Capital
19	LTT - Lab Tech Training
20	Credit Union SA
21	RiAus Education
22 & 23	Future You
24-26	Stile
27	Australian Space Discovery Centre/ Australian Space Agency
28 & 29	Questacon
30	Southern Cross Science
31	Edrolo
32	Flinders University
33	anzuk Education
34	Geoscience Australia
35	AusEarthEd
37	Return to 1616 School Resource
38	Geoscience Pathways Project

Exhibitors **CONASTA70**

1 & 2 CSIRO

CSIRO, Australia's National Science Agency, uses cutting edge science and expertise to connect educators and students with real-world STEM.

With over 40 years' experience, CSIRO Education delivers programs at national and local levels, and works with underrepresented communities to improve STEM engagement.

Over 160,000 students and 3300 teachers take part in CSIRO Education's curriculum-aligned programs annually.

CSIRO has a team of STEM education experts to help teachers find the most suitable programs and resources. Talk to the CSIRO Education team to see how the National Science Agency can enhance your STEM journey.

See csiro.au/education for more information.



3 & 4 Centres of Excellence: Quantum to the Cosmos

ARC Centres of Excellence (CoE) undertake innovative and potentially transformational research. The FLEET, ASTRO 3D, Dark Matter and Oz Grav CoEs want to engage Australian teachers and students in the cutting-edge physics research of Australian scientists. The education and outreach teams at these Centres have developed quality, freely accessible, curriculum-linked education resources for Australian schools including student research projects, VR programs and lesson plans. They also offer opportunities including incursions/excursions, work experience and professional learning for teachers.

FLEET: Future Low-Energy Electronics Technology
<https://www.fleet.org.au/>

ASTRO 3D: All-Sky Astrophysics in 3D
<https://astro3d.org.au>

Dark Matter: Dark Matter Particle Physics
<https://www.centredarkmatter.org>

Oz Grav: Gravitational Wave Discovery
<https://www.ozgrav.org>



5 ARC Centre of Excellence for Engineered Quantum Systems

The Australian Research Council Centre of Excellence for Engineered Quantum Systems (EQUS) is engineering



Australia's quantum future. Our Centre harnesses the underlying rules of the universe to build sophisticated quantum machines for practical applications. We pioneer the design of quantum materials, quantum engines, and quantum imaging systems to solve the most challenging research problems at the interface of fundamental quantum physics and engineering, and work with partners in industry to translate our research discoveries into practical technologies to the benefit of Australia's society and economy. Our capacity building programs are training the next generation of scientists, technologists and entrepreneurs in cutting-edge fundamental research and bench-to-product technology innovation. <https://equs.org/>

6 Scientrific - Vernier

Scientrific Pty Ltd has been providing prompt service and affordable, high quality scientific



equipment throughout Australia for over 30 years.

Scientrific provides support, training and professional development for Vernier Software and Technology data loggers and sensors, IEC products, Adam Equipment Balances, Molymod and many other brands.

When possible Scientrific prefers to sell quality Australian made products. Imported science equipment is carefully selected for both quality, price and on-going support.

Come and say "Hi" to the friendly staff at the Scientrific Exhibit and check out the latest Vernier Go Direct Bluetooth sensors like the waterproof Temperature Sensor or view them on our website at www.scientrific.com.au.

7 Pearson Australia

Our mission is to help people all over Australia make progress through access to better learning. We add life to a lifetime of learning. It's about young learners being able to evaluate, interpret and make a judgement about the credibility of scientific-based information. It's about classmates being able to communicate scientifically, and actively participate in civic and cultural affairs and making scientific contributions. We believe these skills need to be more formalised and explicitly taught, which is why we are integrating these throughout our resources more than we ever have before.



<https://www.pearson.com/en-au/>

8 Royal Australian Chemical Institute

For over 100 years the Royal Australian Chemical Institute (RACI) has been the voice of chemistry in Australia. As the professional body for chemical sciences, we exist to support the needs, education and interests of our members. We also play a leading role in promoting the science, practice and positive impact of chemistry to the public, educational sector, industry and government.

<https://raci.org.au/>



9 Arludo

Arludo is an Australian company creating video games to engage and inspire students to help them understand and use science in their daily lives. Founded by an Associate Professor, Arludo is a team of scientists, educators and technologists building educational products and services people love. Our mission is to increase interest in STEM and improve scientific thinking for students of all genders, ages, and socioeconomic levels no matter where they are.

<https://arludo.com/>



10 & 11 The University of Adelaide

The University of Adelaide unites and serves those striving to change the world—and themselves—for the better. It's a place where history is made.

Established in 1874, we're home to over 29,000 students and 3,000 staff, all striving to create progress. For our community. For all.

This is a university of outstanding quality—ranked as a top 100 global university—in the heart of the city of Adelaide.

We were our country's first university to welcome female students. The first to teach science and business. Our alumni have won Nobel Prizes, led the nation, and walked in space.

So, what's next? <https://www.adelaide.edu.au/>



THE UNIVERSITY
of ADELAIDE

12 Energy, Mining & Resources School Outreach Program

The Energy, Mining & Resources School Outreach (EMRSO) program at the University of Adelaide aims to spark student interest in a diverse range of careers in the energy, mining and resources industry, and the role this sector is playing in our transition to a low carbon economy. The program was formed as a partnership between the University and industry, including Santos, BHP, OZ Minerals, Iluka Resources and the Department for Energy and Mining. The program offers a suite of interactive, curriculum-aligned workshops for Year 7-12 students delivered both in-schools and on campus, as well as senior student networking opportunities.

<https://www.adelaide.edu.au/stem/energy-mining-resources>

13 & 14 Nelson

Nelson is a leading School Education business in Australia and New Zealand, committed to producing customer first solutions and services across 7-12. Our extensive Secondary portfolio of digital and blended teaching and learning resources delivers curriculum implementation support to enrich the learning experience. The student and educator are at the centre of Nelson's learning ecosystems.

<https://cengage.com.au/secondary>



15 Education Perfect



Education Perfect is a complete online teaching and learning solution that empowers educators. We save teachers time with phenomenal resources, engage students with rich adaptive learning programmes, and provide exceptional data analytics that enables educators to plan effectively and act with insight. EP's comprehensive content is targeted at students aged nine to 18 and fully aligns with local curricula to ensure that learning is relevant and authentic. With resources spanning all core subjects, as well as languages, digital technology, and ESOL, EP provides a full programme of learning that can be completed in the classroom or at home and allows educators to truly personalise every student's learning experience.

Come and meet the team at Booth 15.

<https://www.educationperfect.com/>

16 Atomi

Atomi is an online teaching and learning platform that extends learning beyond the classroom and allows students, teachers

and schools to work better together. We've reached hundreds of thousands of students and teachers across Australia through our online videos and interactive lessons, intelligent testing and powerful insights.

<https://getatomi.com/au>



17 Modern Teaching Aids - MTA

Modern Teaching Aids has been helping teachers and educators deliver the right learning outcomes for over 65 years. We stock the largest array of teaching resources and education supplies in Australia.

Please visit us via our website teaching.com.au to discover our full range of over 20,000 resources in robotics, digital technologies, art & craft, mathematics, literacy resources, developmental products, school consumables, STEAM, classroom stationery, science equipment, STEM, sporting gear, school furniture, books, play and educational toys.

We have a specialist team that are waiting to assist you with any enquiries by email sales@teaching.com.au or by phone on 1800 251 497. <https://www.teaching.com.au/>



18 Canberra the Science Capital

Canberra. A super-sized Science experience

Did you know that Canberra is also the Science Capital, with great science based attractions to visit on a school excursion. Explore an abundance of hands-on science at Questacon, delve into important science research at CSIRO Discovery, uncover the secrets of the universe at Mt Stromlo Observatory and Canberra Deep Space Communication Complex, discover science in nature at the Australian National Botanic Gardens, Wildbark at Mulligan's Flat and the National Arboretum Canberra and unearth a world of natural resources at Geoscience Australia. This is just a few of the experiences available in the Science Capital.

<http://www.canberraexcursions.org.au/>



19 LTT - Lab Tech Training

LTT is a specialist Laboratory Operations training organisation, upskilling our School Science Technicians throughout Australia.



With government funding contracts in every state and territory, LTT provides School Sciences Technicians with affordable accredited qualifications designed specifically for the high school sector.

LTT trainers deliver in your workplace! A balance of Face-to-Face vs Online TEAMS sessions is dependent upon your location.

In metro regions 2/3-hour trainer visits are approximately every 6 weeks. Regional and remote locations, there is a greater reliance on online TEAMS sessions. If there are several Science Technicians in a particular region, LTT can create one regional cohort, so that delivery in small groups, rather than individually. <https://www.ltt.edu.au/>

20 Credit Union SA

Credit Union SA's commitment to supporting South Australia's education community remains as strong as ever. We sponsor hundreds of professional development events for educators and give back directly to schools through our School Community Rewards fundraising program. We're ready to show you how our Education Community Banking Benefits, designed exclusively for teachers and education employees, can help you do more with your money. <https://www.creditunionsa.com.au/>



21 RiAus Education

RiAus Education is dedicated to connecting schools, students and teachers with the world of STEM. Our FREE education content connects classrooms with emerging STEM research and break-throughs. We support in-class learning and on-line content planning and creation linked to the Australian National Curriculum with a focus on the literacy of science, science as a human endeavour, and cross-curriculum priorities. Our ever-expanding collection of STEM resources (articles, videos, pod-casts, activities, professional learning) are tailored for use across primary and secondary classrooms, facilitating inspiring and accessible STEM education for all. Join our community today to access FREE content, special events, and more. <https://education.riaus.org.au/>



22 & 23 Future You

Future You, an initiative from the Australia's Government's Women in STEM Ambassador, challenges STEM stereotypes and biases. Our free program, for children aged 8 to 12, aims to increase participation in science, technology, engineering, and mathematics.



We offer free, valuable content for teachers, parents, and students, providing insights into STEM themes. Our resources prioritise skill development by integrating real-world applications with the Australian Curriculum V9.0.

We also provide practical tools for parents to actively participate in their child's STEM journey.

Break barriers, ignite curiosity, and shape a brighter future through Future You. Join us in inspiring the next generation at www.futureyouaustralia.com.

24-26 Stile

From pracs to printed booklets, teaching plans to talking points, activities to assessments, Stile is there for you with everything in one place. But, we know that every classroom is different. Customise any aspect to make it perfect for you and your students. Transitioning to the new Australian Curriculum? Stile has you covered.



Find out more here: <https://stileeducation.com/au/>

27 Australian Space Discovery Centre



Ever dreamt of a career in space? It's not just for rocket scientists and engineers. At the Australian Space Agency we hope to expand your ideas about what jobs exist in the wider space sector from lawyers, to doctors, to tradies. With the focus of the Australian Space Agency to support the growth and transformation of Australia's space industry, creating 20,000 jobs by 2030, there has not been a better time to think about your place in space.

The Australian Space Agency, which was established on 1st July 2018, has a presence Australia-wide with the hub built on Kurna land within Lot Fourteen (in the North Eastern corner of the city of Adelaide). Using our unique geographic location and skills, the Australian Space Agency will help grow a responsible and inspiring Australian space sector, with national and international capabilities. <https://www.industry.gov.au/australian-space-discovery-centre>

28 & 29 Questacon

Questacon – The National Science and Technology Centre strives



to engage all Australians with science, technology and innovation. We're actively building a better future through interactive, relevant and fun experiences in our centres, on the road and online.

We are focused on supporting young people to develop the attributes, skills, knowledge and agency to thrive in tomorrow's world.

We also connect communities across Australia with STEM opportunities through place-based sustainable collaboration. We're focused on building our network of locally led STEM learning ecosystems into the future so Australians can access Questacon – wherever they are. <https://www.questacon.edu.au/>

30 Southern Cross Science

Southern Cross Science has been servicing the scientific community for over 36 years and has an expansive product portfolio. We have a broad customer base including educational institutions, industry and research facilities. There are two arms to the business: laboratory wholesaling; supply and installation of Laboratory Equipment, Clean Room Products, Laboratory Consumables, Chemicals, PPE and Safety Products; the service arm provides Fume Cupboard testing (NATA Accredited), Ultra-Pure water system servicing and laboratory builds/ upgrades. We offer online ordering through the Company website, via telephone and email. The Company holds ISO9001:2015 Quality Management Systems certification.



<https://www.southerncrossscience.com.au/>

31 Edrolo

Edrolo is an Australian publisher trusted by 1,100+ schools, helping 250,000+ Australian secondary school students succeed every year since 2013. Edrolo offers a suite of curriculum-aligned print and digital resources created in partnership with experienced educators, with video lessons, scaffolded content, exam-style questions, exemplar responses, and detailed data dashboards providing insights and analytics to inform teaching practice.



<https://edrolo.com.au/>

32 Flinders University

For over 50 years, Flinders has been a centre of inspiring achievement: from our pioneering research and excellence in teaching to the positive impact we have in the communities we serve.



Ranked in the top 2% of universities worldwide* and No.1 in SA for starting salary, student support and learner engagement,** Flinders University prepares you for the career you want.

Because when you study with us, you get future-focused, internationally recognised degrees that can take you anywhere, with flexible study options that work around your lifestyle. Flinders is easier to access than ever, with online courses available and the Bedford Park campus just a quick train ride from our Tonsley and CBD locations. Find your Fearless at Flinders.

<https://www.flinders.edu.au/study>

33 anzuk Education



At anzuk Education, we see a bright landscape for the future of education. We are a global recruitment company and we work with over 250 independent and Catholic schools in Australia, assisting educators seeking contract and ongoing opportunities.

If you are a Science Teacher or Leader seeking your next career opportunity, we are here to support you on your journey. We also have a dedicated team to assist with casual relief teaching, Executive level appointments and helping with overseas teaching opportunities. We are thrilled to be involved with CONASTA70. See you there! <https://anzuk.education.au/home>

34 Geoscience Australia

Geoscience Australia is the national geoscience organisation and provides information about Australia's geology and geography. Geoscience advice enables communities, government and businesses to make informed decisions, and ranges from the characteristics of rocks and groundwater potential, to satellite imagery and earthquake monitoring. The Education Program at Geoscience Australia has run for over 25 years and continues to evolve. In Canberra, the onsite Education Centre hosts student groups from around the country, virtual offerings for students and teachers are growing, and new education resources for school use are published regularly and highlighted in our occasional Education Updates newsletter.



Australian Government

Geoscience Australia

www.ga.gov.au/education

35 AusEarthEd

Australian Earth Science Education (AusEarthEd) creates and delivers engaging, free resources in support of Earth Science education (F-10 Earth and Space Science and 11-12 Earth and Environmental Science). We also deliver free hands-on incursions and teacher professional development within our current areas of operation – WA (K-12), NSW (11-12), and the NT (T-6). <https://ausearthed.com.au/>



AUSTRALIAN
EARTH
SCIENCE
EDUCATION

37 Return to 1616 School Resource



Department of Biodiversity,
Conservation and Attractions



DIRK HARTOG ISLAND
RETURN TO 1616

The West Australian Government's Department of Biodiversity, Conservation and Attractions (DBCA) promotes biodiversity and conservation through sustainable management of WA's species, ecosystems, lands and attractions.

DBCA is undertaking one of Australia's most important environmental projects – the Dirk Hartog Island National Park Return to 1616 Ecological Restoration Project. To share this real world science with students from years one to nine, DBCA has created a free online education resource. Take a virtual reality tour of the project or zoom up the nasal passages of a 3D Western quoll skull whilst enjoying a little Return to 1616 candy and conservation conversation. <https://www.sharkbay.org/restoration/dirk-hartog-island-return-1616/>

38 Geoscience Pathways Project

A not for profit organisation supporting the teaching of geoscience in South Australian schools.



<http://www.geosciencepathways.org.au/>

Primary Industries Education Foundation Australia

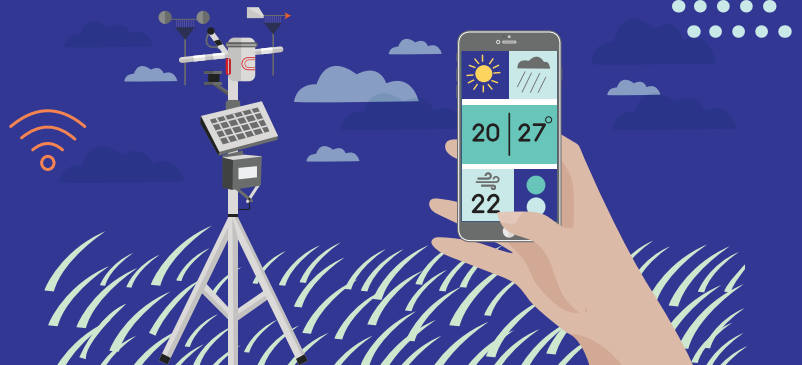
PIEFA's vision is to embed the value of Australian food and fibre production in the national psyche. The Primary Industries Education Foundation Australia (PIEFA) was formed through a collaboration between the Australian Government, primary industries organisations and the education sector and is the one-stop source for educational information and resources to help build knowledge about agriculture, forestry, fisheries and food and fibre within the school system. Through online platforms, PIEFA creates awareness and interest in career pathways in these industries by engaging with teachers, students and communities about where our food and fibre come from.



<https://www.piefa.edu.au/>

THE GiST

Girls in STEM Toolkit



Science impacts almost everything we do, and scientists are working on the front line, solving real-world problems.

Read about everyday science professionals whose work forms an important part of our daily lives on The Girls in STEM Toolkit (The GiST).

From interesting articles, to events, activities and meet-ups, to a career quiz and examples of women doing great things in STEM, The GiST has something for those passionate about science, or just beginning to think about it.

Visit thegist.edu.au or check us out on Instagram, Facebook and Twitter.



Social and Networking Opportunities



SUNDAY 9 JULY

WELCOME TO CONASTA 70

3.30PM - 5.30PM | South Australian Health & Medical Research Institute (SAHMRI)

sponsored by Australian Science Innovations



We look forward to welcoming you to the distinctive SAHMRI building in the heart of Adelaide BioMed City, on Kaurana land. The building's signature dia-grid façade, with more than 6000 windows has earned it the nickname 'The Cheese grater'.

SAHMRI consists of seven floors above street level and three floors below. A concrete bunker in the building's basement houses South Australia's only cyclotron, producing radiopharmaceuticals for diagnosis, treatment, and research every day of the year.

Join us for an afternoon of networking to officially kick off the 2023 Conference! Enjoy local wine tastings from four of South Australia's best wineries; Reillys (Clare Valley), Zema Estate (Coonawarra), Tscharke (Barossa) and Kay Brothers (McLaren Vale), while you meet and chat with the wine makers. Experience some of the best food South Australia has to offer and chat with some of the Science Olympiad alumni.

LAB TECH DINNER

7.00PM | Strathmore Hotel

All Laboratory Managers/Technicians/Assistants are invited to the Lab Tech Dinner 7pm Sunday 9th July, at Café 129. Café 129 is in the Strathmore Hotel, on North Tce, a 10 minute walk or one tram stop from the Welcome Function.

This informal gathering will allow you to meet like-minded Lab Techs from Adelaide and around the country. If this is your first CONASTA, come and make a few friends to sit with during sessions and to share a drink with at Happy Hour. If you have been to many, come and reconnect with old friends.

The meal is a la carte, with plenty of vegetarian or gluten free options. Partners are most welcome.

MONDAY 10 JULY

SCIENCE BREAKFAST - limited tickets available!

7.15AM - 8.15AM | Adelaide Zoo

It's an early start but worth it, with the event hosted in the Fig Tree Function centre in the heart of the Adelaide Zoo! The venue is a beautiful, newly renovated space boasting natural light and lush garden views surrounded by the ambience and activity of the zoo. This year's presentation 'For the sake of the Rhinos' will be delivered by Peter Clark, Director of Monarto Safari Park. Join us for breakfast and find out about Zoos SA's work with conservation both here and in Africa.

Tickets must have been purchased as part of your online registration.

The Adelaide Zoo is a short 3 - 5 minute walk from the lecture theatre hosting the Conference Opening at the University of Adelaide



Wine served at CONASTA 70 social events is proudly sponsored by Reillys, Clare Valley.

STANHOPE SOCIAL EVENT

5.30PM - 7.00PM | South Australian Museum

sponsored by the South Australian Museum



In keeping with our theme 'South Australia as a great outdoor museum', the Stanhope Social Event will be held in the Museum fossil galleries on the third floor of the South Australian Museum.

The Museum fossil galleries are a fantastic window into the remarkable fossil record of South Australia which covers development of life on Earth across a vast geological time scale. From the very first evidence of complex life in the Ediacaran period, through to the dog-eat-dog (or rather Anomalocaris-eat-Trilobite) world of the Cambrian explosion, then into the era of the giant marine reptiles of the Eromanga Sea and more recently the Megafauna, incredible giant animals sometimes found preserved in limestone caves, our world-class palaeontology galleries and collections offer engaging and varied topics for students which align to the Australian Curriculum.

Delegates will have a chance to chat to SAM Senior Researcher Associate Professor Diego García-Bellido and a team of post graduate students to learn more about their research in different palaeontology areas and make connections to the Australian curriculum. And of course there will be an amazing selection of food and wine available throughout the event.

STILE HAPPY HOUR

4.40PM - 6.00PM | The University of Adelaide, The Hub

sponsored by Stile

Join your fellow science teachers and the Stile Team for a science extravaganza! With a fierce science competition, drinks and nibbles, you'll be competing for incredible prizes and, most importantly, glory!



This is a fun way to end your day or a great warm up if you're heading to the Conference Banquet afterwards!

PIEFA CONFERENCE BANQUET

7.00PM - 11.00PM | Adelaide Oval

sponsored by Primary Industries Education Foundation Australia (PIEFA)



The leader in food and fibre education.

The Conference Banquet is a much-loved tradition, with many delegates and guests enjoying a night of fantastic food, company music and dancing. This year the Banquet will be held at the iconic Adelaide Oval in the John Halbert room, with spectacular views onto the oval. Attendees will enjoy a 3 course dinner and 4 hour beverage package including fine Clare Valley wines from Reillys.

Thanks to our sponsor PIEFA, each table will be themed based on a primary industry, food or fibre and attendees will be able to take samples home and match them to Primezone resources to use in their classrooms. Listen out for clues throughout the night for our short quiz and maybe negotiate with other tables about swapping produce as the night goes on!

Tickets must have been purchased as part of your online registration.

FAREWELL DRINKS

4.00PM - 5.30PM | The University of Adelaide, Ingkarni Wardli Atrium

What does the future taste like? Strap yourself in as we lead you through the progressive narrative of Eating Tomorrow...with catering provided by Post Dining at our Farewell Function!

Post Dining are an Adelaide-based duo using creative tools to inspire students to build meaningful relationships with food and the environment. As artists-cross-science communicators, our expertise lies in designing immersive scenario-based experiences which explore contemporary themes in food technology, science and culture.

Three food stations will be set up, one for each Conference theme. Each station will be offering future-focussed foods, hosted by a performer. There will be a Space chef, an archaeologist and a park ranger! Join us for this exciting farewell and find out what the future tastes like.

Developing generations of history makers in science



At the University of Adelaide, we've been making history in science for almost 150 years. Our alumni have won Nobel Prizes, led the nation, and walked in space.

We can't wait to see what's next.



**THE UNIVERSITY
of ADELAIDE**



Keynote Speaker

MONDAY 10 JULY

9.30AM - 10.30AM

BRAGGS LECTURE THEATRE

PROFESSOR MARY L DROSER

Mary Droser is a Distinguished Professor at the University of California, Riverside. Droser has worked for several decades on the fossil record of the Ediacara Biota in South Australia. Along with students and colleagues from the South Australia Museum, Droser has described the oldest sexual reproduction, the oldest evidence of mobility, the oldest animal to live in the water column and our oldest relative – all from South Australia. Droser has also been deeply involved with STEM education and outreach in the US and more recently in South Australia – working to increase awareness of the Earth Sciences as a pathway and career as well as to increase diversity and representation in the Earth Sciences. Droser is the recipient of the SEPM 2020 Moore Medal, the 2020 University of California Dissertation Mentor award and the 2022 National Academy of Sciences Walcott Medal.



Bringing the world-famous half billion year old fossils of the Ediacara Biota to South Australian students: In the classroom and in the field

As ones climbs Mt Lofty or snorkels in the Spencer Gulf or Great Barrier Reef, it is impossible not to be awed at the biodiversity of these and other ecosystems that are teeming with life. But for almost a billion years, planet Earth was lifeless. Over the last three and a half billion years, life evolved in fits and starts from very simple bacteria to the diversity of life as we know it today. For humans, in particular, one of the most critical events in the evolution of life on Earth, after the origin of life, was the advent of multicellular animals. Over half a billion year ago, before adaptations such as skeletons, jaws, or brains had developed, the oldest animals on Earth, referred to as the Ediacara Biota, dominated seafloors and formed Earth's earliest complex communities. The record of these organisms predates the well-known Cambrian Explosion by nearly 40 million years and provides the essential clues on evolutionary innovations such as the advent of animals, the advent of movement, the oldest sexual reproduction and the first appearance of our closest animal relative. These fossils are thus critical to understanding the early evolution of life on Earth and even provide hints as to what we should look for to identify life on other planets. Fossils of the Ediacara Biota, first discovered in South Australia by Reg Sprigg, consist of macroscopic, morphologically diverse and generally soft-bodied organisms that occur globally but have a particularly wonderful record at the new Nilpena Ediacara National Park (NENP), west of the Flinders Ranges. NENP is one of the world's finest preserved and most diverse evidence of the Ediacaran 'explosion of life' with more than 80 morphologically different life forms preserved in place in their original communities. This history and the resulting fossil discoveries occurred in the backyard of South Australian students providing a personal introduction into geology, paleontology, and natural exploration that can be woven into Australian school curriculum through online exercises, museum visits, virtual field trips to NENP and actual field trips.

**Keynote Presentation
sponsored by Future You**

**FUTURE
you**

Cutting Edge Presentations



MONDAY 10 JULY | 11.10AM - 12.10PM

DR DOMINIC MCAFEE

The University of Adelaide

Dominic is a marine ecologist at the University of Adelaide working on the recovery of Australia's lost marine ecosystems, particularly our forgotten oyster reefs. Dominic's research seeks to understand the ecological and social complexities of the environments in which restorations take place, so we can develop solutions that ensure marine restorations are both a social and environmental success. To do this he works with social scientists, economists, and lawyers to navigate the human side of restoration, while developing ecological solutions to maximise the productivity and resilience of restored ecosystems.



From Amnesia to action: restoring Australia's forgotten oyster reefs

ROOM: Barr Smith South 1062

Few people know that just 200 years ago, Australia's coastline was carpeted by about 7,000 km of oyster reef. These reefs provided the foundations for thriving marine ecosystems and Indigenous coastal economies for thousands of years, but were near eradicated within a century of European settlement. Today, these reefs are considered functionally extinct and have been largely lost from human memory. However, momentous change is now afoot. Over the past decade, a restoration program has been gaining rapid momentum, from an initial pilot reef restoration in 2015 to 50 restorations nationwide by 2022 and plans for many more. This is the story of how this transition, from widespread amnesia that shellfish reefs ever existed, to action on bringing them back, was achieved. It's a story of how ecologists and social scientists, conservation NGOs, multiple levels of government, Traditional owners and local community groups came together to enable what is now Australia's largest marine restoration program. Today, local communities are increasingly leading these projects and school students are engaging with technology to monitor these reefs. To tell this story in a broad context, I will walk you through the surprising history of how oysters shaped human history, describe the contemporary challenge and opportunities for restoring lost oysters, and provide a vision for a new culture of restoration that engages all generations in coastal stewardship.

DR ERINN FAGAN-JEFFRIES

The University of Adelaide

Entomologist and science communicator Dr Erinn Fagan-Jeffries specialises in the taxonomy of parasitoid wasps, which lay their eggs on or in the bodies of other insects. Erinn is passionate about engaging people in the science of taxonomy, and has guided school groups to find, name and describe species in their local environment. She is currently an Australian Biological Research Studies Postdoctoral Fellow at The University of Adelaide, and an Honorary Researcher at the South Australian Museum.



Insect Investigators: Biodiversity and Taxonomy

ROOM: Barr Smith South 1063

Documenting our biodiversity is an essential fundamental process that underpins the applied fields of conservation, biosecurity, and environmental management. It is estimated that only around 30% of the Australian fauna and flora are currently named and described scientifically, meaning that 70% of the living things in our environment are not formally documented. Taxonomy is the science of classifying, naming, and describing species so that we can better understand, conserve, and sustainably use our biota. As an insect taxonomist, I use both morphological information (what something looks like) and DNA data to identify insects and find species new to science. In 2022 we worked with 50 regional schools as part of a citizen science project (Insect Investigators) to collect thousands of insects, sequence their DNA, and determine if we had found species new to science that we could name in collaboration with students. In this session, learn about why documenting our biodiversity is so important and how we go about it as taxonomists, find out how you can help document biodiversity with your class, and hear about the scientific results of the Insect Investigators project!



Cutting Edge Presentations

MONDAY 10 JULY | 11.10AM - 12.10PM

MICHAEL WAITE

Fertilis

Michael is a people-oriented leader who cultivates a strong, values-driven culture that motivates others to reach their full potential. As a systems thinker and engineer, Michael brings a unique perspective and technical know-how to the table as a versatile leader in executive management. His unique blend of skills have seen him delivering results across multiple industries, including automotive, defence, space, transport, and medical devices.

Fertility - a big challenge on a small scale

ROOM: Barr Smith South 2032

The world is facing a fertility crisis with a decline in birth rates and a rise in infertility globally. This not only affects individuals and couples trying to start a family, but also has broader consequences for society such as an aging population and looming economic and social problems. But, with the advancement of assisted reproduction technologies such as In Vitro Fertilisation (IVF), many couples are given the hope of starting their own family.

Though IVF has been around for a while, it's still a challenging and often stressful journey with low success rates. However, the future is looking bright with new technological advancements like nano-scale 3D printing, which hold the potential to revolutionise the field and help couples achieve their dreams of parenthood.



DR SHERYN PITMAN

Green Adelaide, Department for Environment and Water

Sheryn has long worked in the field of bringing people and nature together. Currently leading the Adelaide National Park City project with Green Adelaide, she has also led the state's Green Infrastructure and Sustainable Landscapes programs hosted by the Botanic Gardens of SA, the Inspiring South Australia program hosted by the SA Museum, and habitat restoration projects with Greening Australia. She has also worked as creative writer, and as an educator in primary and secondary schools, and in Universities. Sheryn's PhD in Ecological Literacy explored some of the complex relationships people have with the natural world along with ways to cultivate an informed population with the capacity to make effective and sustainable environmental decisions.



The global National Park City movement: connecting people and nature in urban environments for health, resilience and sustainability of cities

ROOM: Barr Smith South 2040

Adelaide has joined the international family of National Park Cities, declared in December 2021 and the second in the world after London. What does this mean?

While a National Park City is essentially about bringing people and nature together, critical to the health and liveability of cities, it is also about much more than that. We have a springboard to engage with more people, more of our community, to address inequity, to be more inclusive and work more closely with First Nations people. It is the perfect time to highlight the value of green and blue spaces, and to address the health and wellbeing, climate, economic, aesthetic, natural resource, biodiversity, food and sense of place benefits of nature in cities that have been acknowledged as important for a long time now. In addition, being a National Park City provides opportunity for leadership both nationally and internationally.

Cities are our primary human habitats and people have known for some time that we need a new vision for cities. Nature-based solutions must be part of inclusive planning processes to mitigate against and adapt to climate change, to restore functional ecosystems and improve environmental health, and to improve human health - social, physical and mental. We've learned a lot, and accept the value of science, technology and innovation. We also now understand the value of nature in cities.

Becoming a National Park City provides refreshed and new opportunities to bring the whole of greater Adelaide along on the journey towards more liveable, sustainable, engaged and empowered communities.

Cutting Edge Presentations

MONDAY 10 JULY | 11.10AM - 12.10PM

ASSOCIATE PROFESSOR ZOHRA LASSI

The University of Adelaide

Zohra Lassi is a trained epidemiologist recognised internationally for her work identifying interventions for improving reproductive, maternal, newborn, child, and adolescent health and nutrition in disadvantaged settings by advancing knowledge in public health practice and translation into global health policies and guidelines. She has published 200+ peer-reviewed papers, 11 book chapters and several research/technical reports. She completed her PhD in late 2015 and has worked in perinatal research for more than 10 years. Her research interests include social determinants of health-related to RMNCAH&N, particularly in marginalised and low-resource settings. She has a special interest in research synthesis, scaling up evidence-based interventions in community settings, and implementation research in health system research. Currently, she is an Associate Professor affiliated with the Robinson Research Institute at the University of Adelaide.



Social disparity and role of education in health

ROOM: Barr Smith South 2051

Sustainable Development Goals (SDGs) have suggested the necessity of an integrative and intersectoral approach to the global health agenda. In recognition of this, education has been considered a core social determinant of health, with SDG 4 focusing on ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all, with an explicit indicator of better education for girls. Evidence shows the positive relationship between parental education and child health indicators and, in particular, the contribution of maternal education to declines in child mortality. Pathways include economic empowerment, health literacy, health-care-seeking behaviours, working conditions, family structure, and provision of opportunities for quality early childhood development and education. Maternal education potentially results in the acquisition of literacy skills, economic independence, and independent decision-making, leading to improved health-care-seeking behaviour that consequently can improve healthcare and vaccination coverage among children and reduce the burden of childhood diseases and mortality.

The session would talk about the sustainable development goals, social determinants of health and their potential pathways towards influencing the health of mothers and children, particularly those from disadvantaged and less privileged settings and low- and middle-income countries.

TRISH HANSEN

Trish Hansen is the Founding Principal of Urban Mind Studio which exists to enrich the creative and cultural life of people and places in myriad ways.

As a natural collaborator and complex systems thinker, Trish has provoked, pioneered and managed social enterprises, programs and projects, in the public and private tertiary adult and paediatric health, urban, arts and cultural sectors.

Trish is a strategist, systems designer and regenerative practitioner with specialist knowledge and skills in world views, biomimicry, doughnut economics, regenerative practice, wellbeing, complexity, futures, the arts and community and cultural development.

Currently the Chair of Brink Productions, is a Good Design Australia Ambassador, Fellow of the Centre for Conscious Design and Founding Chief Executive Officer of Kindred Australia, as well as serving on other committees.

Regenerative Futures Lab

ROOM: Barr Smith South 2052

We know we are amid interesting and challenging times, needing to transform the ways we live and work in myriad ways for all humans to thrive on a flourishing planet.

We are being called to change in ways we might not have yet imagined; our inner selves, our interaction with each other, and the ways we live, work, play and learn.

Learning to think differently is part of the journey.

In this interactive workshop we will explore deep time world views, nature's design genius and use practical approaches to understand our role and impact in ways that nourish ourselves, each other and the places we live.



Workshop Outline - Monday 10 July



1.30PM - 2.30PM

		Room
1.1	A Model for Engaging STEM Tasks	Horace Lamb 422
1.2	Exploring the ethics of animal dissection	Barr Smith South 1062
1.3	Future Proof with EES	Braggs 313/314
1.4	Study skills to set your students up for success in senior school	Barr Smith South 1063
1.5	Breeding Bunnies to learn Genetics	Braggs 340
1.6	Exploring STEM Careers through the Excitement of Space	Barr Smith South 2032
1.7	STEM for Humanity	Hughes 322
1.8	Inquiry approaches using Vernier Data loggers in High School Biology	Braggs 350
1.9	Barbies, Balconies & Bungees	Hughes 323
1.10	Food and fibre teaching programs of Primary Industries Education Foundation Australia	Barr Smith South 2052
1.11	Questacon's Cyber Castle Challenge: Using Minecraft Education to teach digital technologies	Barr Smith South 2051
1.12	Using the Engineering Design Process to Solve Real-World Problems	Barr Smith South 2040
1.13	Discovery tour: science teaching resources design and features	Ingkarni Wardli 7.15
1.14	Earth Science activities for Foundation to Year 6	Barr Smith South 2060
1.15D	Accessing and analysing real Earth science data - DOUBLE PART 1	Ingkarni Wardli B17
1.16D	Differentiation of Tasks in AC 7-10 Science - DOUBLE PART 1	Ingkarni Wardli B18

2.40PM - 3.40PM

2.1	A Place for Space: Using modern space applications to inspire your students	Hughes 323
2.2	Taking Chemistry Lightly: Using Spectroscopy in Your Classroom	Braggs 340
2.3	Space Careers Wayfinder	Barr Smith South 2032
2.4	Microbiology: A School Perspective	Barr Smith South 1062
2.6	Getting Ahead of the Australian Curriculum	Barr Smith South 1063
2.7	Supporting young Indigenous women to succeed in STEM	Hughes 322
2.8	The Australian Science Olympiad Program - supporting academically gifted students	Ingkarni Wardli 7.15
2.10	Handy Earth Science	Braggs 313/314
2.11	Real research data to get students thinking, testing and innovating in the classroom	Barr Smith South 2051
2.12	The Science of Us - Measuring humans using Vernier Data Loggers	Braggs 350
2.13	Hands-on High School Electricity with Tiny Science Lab	Barr Smith South 2052
2.14	Return to 1616 Free Education Resource	Barr Smith South 2060
2.15D	Accessing and analysing real Earth science data - DOUBLE PART 2	Ingkarni Wardli B17
2.16D	Differentiation of Tasks in AC 7-10 Science - DOUBLE PART 2	Ingkarni Wardli B18

Workshop Descriptions

Monday 10 July



SESSION 1 | 1.30PM - 2.30PM

Coffee Cart Sponsor

1.1 A Model for Engaging STEM Tasks

Jane Hall-Dadson, UTAS

(As described by accomplished teachers of STEM)

The enthusiasm generated at the STEMX Academy in 2019, while participants worked with suggested guidelines to plan STEM tasks, was palpable. This realisation, along with a lack of definitive STEM planning tools in the literature, was the stimulus for a social science research project undertaken by one of the academy participants over the next few years at the University of Tasmania. The presenter surveyed and interviewed a number of STEMX alumni and other capable STEM teachers, using their experiences and expert opinions to produce the Model of Engaging STEM Tasks (MEST) that will be presented and explained in this workshop.

Our educational authorities have embraced the STEM teaching paradigm, but teachers need support to implement STEM in their classrooms and there is a lack of guidelines or consensus about how to effectively implement lessons or teaching sequences leaving some teachers at a loss. Well-designed STEM activities can develop resilience, thinking skills and the ability to problem solve; building 21st century skills that enable children to negotiate change and become more employable (Beswick & Fraser, 2019). This presentation describes a planning model that can help teachers develop engaging STEM learning sequences in their context.

Examples and anecdotes relating the joyful experiences of both students and their STEM teachers will be used to illustrate the power and potential of the MEST planning model. Discussion around how the MEST could be used in participants' classrooms will be encouraged and if time allows some collaborative planning could begin.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

1.2 Exploring the ethics of animal dissection

Rachel Smith, Humane Research Australia

Animal dissections can have a profound impact on future study and career paths for students. This workshop aims to explore differing perspectives on the value and ethics of animal dissection, outline legal requirements, provide questions and suggested exercises you may wish to use with your students when discussing the ethics of dissection, and will recommend professional development opportunities on animal use in science and teaching more broadly.

Target Audience: senior secondary (10-12), lab officers

1.3 Future Proof with EES

Joanne Watkins, Australian Earth Science Education

The Earth and Environmental Science courses offered to Year 11 and 12 students across Australia are full of engaging, real-world, critical topics. This workshop will explore some of the hands-on activities that AusEarthEd shares for free use in your classroom, bringing context, excitement and exploration into your classroom. Inspiring the next generation of critical thinkers!

Target Audience: senior secondary (10-12)

1.4 Study skills to set your students up for success in senior school

Rebecca Wilde and Steve Dornan, Stile

Research shows that note-taking and studying are invaluable, lifelong, transferable skills that strongly predict student achievement. But, knowing how to study or take effective notes is something we often expect our students to already know or pick up as they move through school. Research demonstrates that these skills need to be explicitly taught and scaffolded, but how do we find the time in our ever-busy classrooms and increasingly crowded curriculum? And what skills, techniques and strategies should we actually be teaching them?

In this session, we'll explore the most effective note-taking and learning strategies based on cognitive science, and practical ways you can teach and scaffold these skills from Year 7-10 to ensure your students are set for success in senior science, and beyond.

Target Audience: junior secondary (7-10)

1.5 Breeding Bunnies to learn Genetics

Nicolette Anne Wheaton, The Glennie School

A fun hands-on activity to help students to learn about the random segregation of alleles and expression of recessive/dominant traits. Ultimately creating a rabbit. Rabbits can then be further “bred” to consider possible outcomes through the completion of Punnett Squares. This can be simplified down to Year 9 or extended up to assist Year 12 with knowledge and understanding of genetic vocabulary.

Target Audience: junior secondary (7-10), senior secondary (10-12)

1.6 Exploring STEM Careers through the Excitement of Space

Claire Hughes, The University of Adelaide

Studying space in schools is important for several reasons. It creates excitement and engages young minds beyond their daily experiences, while also promoting economic growth and the development of STEM skills. While not all students may want to pursue STEM careers, future job tasks will require these skills, making it vital to emphasise their importance. By showcasing the variety of careers available in the space industry, we can help students understand how their learning can translate to future job opportunities.

This workshop will use student-centred, hands-on approaches to promote space as a context for learning about STEM careers and encourage teachers to engage their students in discussions and activities related to this topic. Participants will have a deeper understanding of the economic and social reasons for studying space, as well as the skills and qualifications required for STEM careers with a future.

Target Audience: junior secondary (7-10)

1.7 STEM for Humanity

Nathaneal Scherer, The University of South Australia

STEM for Humanity is a program developed and run by the University of South Australia’s Education Outreach Team. It is a thought-provoking yet enjoyable workshop that combines the humanities and STEM, exploring ways that scientists and engineers can work with communities in developing countries to support and improve lives, in a manner that is sustainable within the community.

Participants undertake three major STEM challenges, each of which reveal how STEM knowledge and practices can change people’s lives for the better. Each of the three challenges is based on a real-world case file, enabling students to see the link between what they do in class and how it has proved beneficial in real life. Students learn how, amongst other things, map making, satellite communication, GPS systems and 3D printing can be applied to solve environmental and humanitarian problems, and how using simple materials with sensible engineering processes can make dirty water clean.

While the program is run with specialised equipment at UniSA’s Mawson Lakes campus, it can easily be adapted for classroom use. This workshop will take participants through the program, including resources and some of the activities students undertake, and show how these can be adapted and applied in the school classroom.

Target Audience: junior secondary (7-10), senior secondary (10-12)

1.8 Inquiry approaches using Vernier Data loggers in High School Biology

Stuart Lewis, Scientrific Pty Ltd and Krishna-Lee Currie, Glenunga International High School

Are you looking at ways for collecting quantitative biological data related to experiments in the Australian curriculum? Discover how with the implementation of high-quality sensors and experiments will enable your students to explore science in new ways and help them achieve their personal best. This workshop explores Biology using a variety of Vernier Data loggers and probes. Multiple work stations will be used for participants to experiment with support from presenters. Some topics covered will be cell respiration, yeast fermentation, photosynthesis in plants, ethanol production, enzymes in action - catalase activity, diffusion through membranes, decomposition of hydrogen peroxide.

Target Audience: junior secondary (7-10), senior secondary (10-12), lab officers

1.9 Barbies, Balconies & Bungees

Karina Darling, St Mark’s College

Balanced and Unbalanced Forces in Year 7. Struggling to make that engaging? Well - this is the workshop for you! This workshop will walk participants through a unit on Balanced and Unbalanced Forces from the perspective of Extreme Sports (Bungee Jumping). You will test out the learning tasks from a Unit of Work, look over the assessment format and get some ideas about guiding Year 7s through Physics.

This is a tried and tested Unit of Work that was taught in 2022 to four different classes of Year 7s.

Target Audience: junior secondary (7-10)

1.10 Food and fibre teaching programs of Primary Industries Education Foundation Australia

Luciano Mesiti, Primary Industries Education Foundation Australia

Primary Industries Education Foundation Australia (PIEFA) is a not for profit educational organisation that develops and promotes teaching about food and fibre across all curriculum areas.

This presentation will showcase new science based curriculum focused PIEFA secondary and primary teaching resources. The presentation will focus on the resources found on Primezone and Primezone Academy and will showcase new primary and secondary resources about mushrooms, meat and livestock, horticulture, forestry, grains and pork and several other industries.

Target Audience: primary (R-6), junior secondary (7-10)

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

Broderick Matthews, Questacon - The National Science and Technology Centre

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. The team will also share the online teacher resources and student playbook that accompany this curriculum linked program, along with supporting videos which tie in-game concepts to real world examples of cyber careers and skills, introducing students to cyber security professionals.

The Questacon Cyber Castle Challenge is part of Questacon's Cyber Program, that delivers workshops and challenges for primary students and works to connect educators with leaders in the cyber industry. The Cyber Program supports the Australian Government efforts to improve cyber security skills, awareness and job readiness as part of Australia's Cyber Security Strategy 2020. Aiming to help prepare young Australians for world class careers by building foundational skills in cyber security and STEM.

For further information head to <https://www.questacon.edu.au/about/programs/questacon-cyber> or email us: cyber@questacon.edu.au

Target Audience: primary (R-6), junior secondary (7-10)

1.12 Using the Engineering Design Process to Solve Real-World Problems

Rosemary Anderson, Tasmanian Department for Education, Children and Young People - Teaching and Learning and Bronwen Baume-Tarrant, Sacred Heart College, Tasmania

In this workshop, we will show how integrated STEM learning can be used to solve real-world problems using the Engineering Design Process. We will show how we have used the Engineering Design Process to excite and activate critical thinking in students through real-world problem-solving in Tasmanian Government and Catholic schools. Participants will have an opportunity to wear students' hats and use the engineering design process to solve given real-world problem challenges. In solving these challenges, participants (i.e. students) will apply skills from the entire spectrum of STEM disciplines.

What does this integrated STEM learning offer students?

- Understanding of real-world uses of STEM
- Application of Science and Mathematics concepts
- Application of the Engineering Design Process
- Application of coding and programming skills
- Hands-on, real-world problem solving
- Application of critical and creative thinking skills

Target Audience: primary (R-6), junior secondary (7-10)

1.13 Discovery tour: science teaching resources design and features

Australian Academy of Science Education Team

Join us to explore approaches to designing teaching and learning resources and preview our innovative approach to supporting the needs of diverse teachers and students.

In this show-and-tell style session, we'll introduce a range of cutting-edge open-source digital teaching resources from around the world, and participants will be invited share online resources they recommend too. Bring your own device and explore with us!

Share what works for you, learn what works for others and find out how the Academy is taking the next step with its long-standing program Primary Connections to bring you what you need in 2023 and beyond.

Together, we'll build a picture of the features teachers find most useful across a range of school contexts, and we'll test your feature list against the Australian Academy of Science's new Design for Learning approach to teacher resource design.

Target Audience: primary (R-6)

1.14 Earth Science activities for Foundation to Year 6

Lachlan Hallett, AusEarthEd

Want ideas for teaching Earth Science?

Come along for engaging hands-on demonstrations and lesson ideas aligned with the Foundation to Year 6 curriculum, all from our free Earth & Space Science resources. These form part of our Primary Australian Literacy Mathematics and Science (PALMS) program.

Target Audience: primary (R-6)

1.15D Accessing and analysing real Earth science data - DOUBLE SESSION PART 1

Tamara Alden and Dominic Iffland, Geoscience Australia

Data and science inquiry go hand-in-hand. Geoscience Australia has vast amounts of raw and processed data that school communities are relatively unaware of; during this workshop participants access different types of surface and subsurface data portals and immerse themselves in case studies ready for classroom use.

Please bring your own device to the workshop. You will become familiar with Earthquakes@ga.gov.au and the rich data within it regarding earthquake observations. Digital Earth Australia (DEA) provides access to 30+ years of Landsat satellite observations from space and we will explore some of the powerful tools created for bushfire control, wetlands monitoring, flood risk and tracking coastal changes. Participants will also learn to save, manipulate and link a series of images into a 'story' for teaching purposes or for students to use as reports.

Using another portal (<https://portal.ga.gov.au/persona/education>) we will demonstrate how to load different types of national or local geological data layers including elevation, lithology and hydrogeology features.

Participants will leave with a better understanding of the geological and geographical data available from Geoscience Australia, how this data may be used in classroom inquiry activities and how to enable students to access, manipulate and present the data for themselves.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary

1.16D Differentiation of Tasks in AC 7-10 Science - DOUBLE SESSION PART 1

Jason Greenslade, Westminster School

Differentiation is critical to meaningful task design for the modern student. We will discuss different ways to differentiate both practicals and assignments in Science so that the range of learners can access tasks.

Focus will be on AC Year 7-10 in Science.

Target Audience: junior secondary (7-10)

BRIGHT EDUCATION
Creative educational products at an affordable price

Help your students explore their budding interest in science and STEM with our educational posters and books. Our reliable resources cover a wide range of topics, giving your class the perfect starting point to expand their knowledge. Our materials will help your students to develop critical skills and gain a deeper understanding of science.

Our Science posters are designed to engage students and improve their scientific understanding of core Biology, Chemistry, and Physics topics. Featuring bright and colourful visuals, they make learning these topics fun and effective.

Energy Stores & Systems
Forces
DNA
Cell Structures
Periodic Table
Biology Basic and Beyond
Science Real World
Focus on Physics
Science Investigations Classroom
Designing Scientific Experiments
Analysing Scientific Experiments
Explaining Scientific Experiments
States of Matter
The Atom
Apparatus
Energy Resources
Acids and Alkalis

www.brighteducation.com.au

browse many more science resources here!

info@brighteducation.com.au

SESSION 2 | 2.40PM - 3.40PM

2.1 A Place for Space: Using modern space applications to inspire your students

Alice Fairey, Hannah Vine Hall, Isabella McCulloch and Maddy Parks, Australian Space Discovery Centre

Join the team from the Australian Space Discovery centre to explore how space applications can create engaging new lesson content across broad science topics, and why space literacy matters to your students.

Almost all domains of STEM have some contemporary connection to space. In this interactive presentation, we will help you discover space applications to excite and inspire your Science students. From space spectroscopy for environmental management, through soil-less horticulture for growing food on the Moon, to how atomic timekeeping on satellites makes the modern internet possible, there is a space application out there to enhance almost any topic at any year level.

Space technologies are deeply embedded in our lives today, and their influences on the way we live, work, and research is continuously growing. In 2020, the industry market researcher IBISWorld reported over 15,200 people were already working in space industry jobs in Australia, and that number is targeted to grow to around 30,000 jobs by 2030. From primary industries through to human and information services, today's students' careers will be touched by space, regardless of whether they work directly in the space sector.

Space also provides an exceptional vehicle for exploring the human elements in STEM alongside technical concepts. It sparks accessible discussions around ethics, philosophy, law, and aesthetics, relating to real, contemporary issues. These in turn provide opportunities to consider and empathise with Indigenous perspectives, both Australian and globally.

Space awareness and literacy will serve your students well throughout their lives and careers; this presentation will help you to guide them to their place in space.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

2.2 Taking Chemistry Lightly: Using Spectroscopy in Your Classroom

Dr Hamish McTernan, St Peter's College

This workshop will demonstrate how solution spectroscopy can be implemented in SACE and IB Chemistry. The session will cover how classroom spectrophotometers can be implemented to teach the concepts of analytical spectroscopy, kinetics and equilibrium in formative and summative experiments

Target Audience: senior secondary (10-12), lab officers, tertiary

2.3 Space Careers Wayfinder

Robert Hollow and Bill Flynn, CSIRO

The establishment of the Australian Space Agency and the Government's stated aim of tripling the number of people working in the space industry and related careers by the end of the decade raises the questions of where are these workers coming from and what are the career possibilities. "Space Careers Wayfinder" is a free, online educational program that provides resources to high school students, teachers, career advisors and parents on options for careers in the space industry.

Developed by CSIRO in collaboration with ANU the project includes a series of videos, each profiling someone working in a space-related role. The profiles include a broad cross-section of people and careers. Examples include satellite systems engineers, payload scientists, communicators, a medical doctor working in the Antarctic, a space ethicist, an entrepreneur and trade technicians building launch vehicles. Each video has an accompanying set of online activities and resources, aligned to the Australian Curriculum.

In this workshop we discuss the philosophy underpinning the program and show examples of the videos and classroom activities. We'll discuss ways in which the material can be used in the classroom and with students.

Target Audience: senior secondary (10-12)

2.4 Microbiology: A School Perspective

Ginny Ward, Science ASSIST

Microbiology is an evolving area in high school science but are you aware of the type of microorganisms and techniques allowable for use in your school jurisdiction.

This workshop will cover the requirements for working safely with microorganisms in school science laboratories:

Does your science laboratory comply with the requirements for working with microorganisms? Should staff have training in microbiological skills? What types of microorganisms you are allowed to handle: Wild cultures or purchased pure cultures? Aseptic techniques - what are they? Should you conduct a biological risk assessment?

What are approved activities: Subculturing? Types of media, preparation and storage methods? Incubation temperatures? Decontamination of waste - sterilisation or disinfection? Suitable sterilisation methods - steam steriliser or autoclave? Is chemical sterilisation or microwaving a suitable alternative to autoclaving? What should be in a biological spill kit? What are specific lab safety rules when working with microorganisms?

Target Audience: junior secondary (7-10), senior secondary (10-12), lab officers

2.5 Bringing Science to Life with Virtual and Augmented Reality

Daniel Becker, Lumination

Immersive technology is transforming the world of work, and thus must be integrated into education to best prepare our students for the future. In the medical field, surgeons are using virtual reality to train for difficult operations, in biology, immersive technology is improving the learning of tasks that require spatial and visual memory, and in chemical engineering, as a visualisation tool for viewing 3D models of processes.

Teaching tomorrow's workforce in the digital age can be made more successful by embracing the new technologies available, presenting a wealth of opportunities for teachers to unlock student learning potential in STEM. Using Virtual Reality (VR) and Augmented Reality (AR) in science, students can better conceptualize difficult to understand concepts, inspiring creativity and sparking student imagination.

Lumination is at the forefront of this technology and sets out to revolutionise the way we teach, learn and work. This workshop will give you a hands-on VR/AR experience that will showcase how immersive technology can bring the Australian Science Curriculum to life, increasing student engagement and retention. You will walk away inspired to deliver the science curriculum using an innovative approach to learning, enhancing student learning outcomes and leading our students into the future

Target Audience: junior secondary (7-10), senior secondary (10-12)

2.6 Getting Ahead of the Australian Curriculum

Rebecca Wilde and Steve Dornan, Stile

With the release of the new Australian Curriculum, Stile has taken a deep dive into all of the documentation so that you don't have to! In this workshop, we'll cover the key points including the changes to the Australian Science Curriculum, what they mean for teachers of Years 7-10 science, how it might impact other curricula and what Stile is doing to prepare for these changes. We'll also leave time for your questions at the end.

Target Audience: junior secondary (7-10), senior secondary (10-12)

2.7 Supporting young Indigenous women to succeed in STEM

Kim Dyball, Melissa Tipo and Myra Singh, CSIRO

Do you have young Aboriginal and/or Torres Strait Islander women in your class who are interested in STEM? Would you like to learn how to best engage young Indigenous women in STEM? Do you want to be part of the movement to increase the representation of women in STEM careers? If so, join us as we share some concrete ideas and strategies to enhance your approach to STEM in your classroom, including the positive impact of role models, how to create a culturally safe and inclusive learning environment and practical strategies and ideas for embedding Indigenous voices and perspectives within your teaching.

The Young Indigenous Women's STEM Academy is a national program for young Aboriginal and/or Torres Strait Islander women from Year 8 through higher education and into graduate employment. The Academy is an investment in a generation of Aboriginal and/or Torres Strait Islander female leaders, role models and game changers in Science, Technology, Engineering and Mathematics (STEM) fields. CSIRO, in partnership with CareerTrackers and in consultation with the National Indigenous Australians Agency and Aboriginal and/or Torres Strait Islander peoples, is working to design and deliver the Young Indigenous Women's STEM Academy.

Join us for this presentation to learn how the Academy implements a culturally safe, inclusive practice to provide targeted, long-term support and access to opportunities that promote STEM careers. Indigenous voices and perspectives are a critical part of these opportunities, with the inclusion of Indigenous mentors, role models and STEM ambassadors key to successfully engaging, supporting and guiding the young women.

Target Audience: junior secondary (7-10), senior secondary (10-12)

2.8 The Australian Science Olympiad Program - supporting academically gifted students

Anita Trenwith and Deb Smith, Australian Science Innovations

In this workshop teachers will be given an overview of programs conducted by Australian Science Innovations which support and challenge academically gifted students. The workshop will provide a brief overview of the Australian Science Olympiads, the Junior Science Olympiads and Curious Minds - Girls in STEM. Teachers will also be introduced to Olympiads Online which is suite of free online resources which have been designed specifically to provide challenging activities for gifted students. These resources support students who are contemplating sitting the Australian Science Olympiad exams and are available free of charge to all Australian teachers and students.

Target Audience: junior secondary (7-10), senior secondary (10-12)

2.9 Using planetarium software to enhance trigonometric analysis

Dr Sam Moyle, Australian Science and Mathematics School

Authentic mathematics connection to real world science pursuits is vital to develop rich understandings of mathematical applications and building learner capabilities to solve challenging problems.

A strong connection between the Science Understanding sub-strand, Earth and Space Sciences and Mathematics strand, Measurement and Geometry, particularly Pythagoras and trigonometry can be made using the freely available Planetarium software -Stellarium.

This workshop is derived from our Earth and Cosmos subject at ASMS, specifically, our 'Trigonometry challenges' task, and will allow participants to explore how investigation of universal objects connects with calculations of their placement relative to Earth or other universal objects utilising the Stellarium software.

Target Audience: junior secondary (7-10), senior secondary (10-12)

2.10 Handy Earth Science

Joanne Watkins, Australian Earth Science Education

WASP is back with more of the hands-on, engaging Earth and Space Science and STEM activities that you know and love! Join us to explore some of our favourites, along with some activities you might not have tried before. A great way to gear up for an exciting term of Earth and Space Science with your lower secondary Science classes.

Target Audience: junior secondary (7-10)

2.11 Real research data to get students thinking, testing and innovating in the classroom

Dr Bridget Murphy and Ms Julie Mulholland, ANSTO

Innovation is reliant on curiosity, analysis and critical thinking - the skills that all scientists use when conducting scientific investigations.

This workshop features a resource of classroom-ready activities that take students step-by-step through the development and write up of a scientific investigation about the air we breathe, using authentic scientific data. The resource was designed by ANSTO educators in collaboration with researchers from the Centre for Atmospheric Chemistry at the University of Wollongong.

This is an interactive workshop in which you will process and analyse authentic and current real-world data to formulate the same conclusions as the scientists!

Target Audience: junior secondary (7-10)

2.12 The Science of Us - Measuring humans using Vernier Data Loggers

Stuart Lewis, Scientrific Pty Ltd

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?

Target Audience: junior secondary (7-10), lab officers

2.13 Hands-on Electricity Workshop for Upper Primary Teachers

Jacob Strickling, Tiny Science Lab

In this workshop, participants will learn how to effectively teach electrical circuit theory by using the Electricity Sets from Tiny Science Lab. Through engaging, interactive activities and experiments, teachers will gain a deeper understanding of electrical circuits and will leave with practical strategies and resources for teaching these challenging concepts in the classroom.

Target Audience: junior secondary (7-10), senior secondary (10-12)

2.14 Return to 1616 Free Education Resource

Wendy Payne, Mandy Bamford and Nathan Ducker, Department of Biodiversity, Conservation and Attractions

Return to 1616 education resource: Engage learners in real-world science with one of Australia's most important environmental projects happening right now - the ecological restoration of Dirk Hartog Island National Park!

WA's largest island, Dirk Hartog Island in the Shark Bay World Heritage Area was pristine in 1616 when Europeans first visited. Since then, introduced plants and animals have degraded the island's rich native flora and fauna.

After successfully achieving the world's largest island eradication of feral cats and goats, the Return to 1616 project is now restoring the island's ecology and re-establishing a suite of locally extinct threatened fauna species. It has inspired a new digital education package that engages learners in developing real-world solutions to today's environmental problems. Join us to explore a free online resource that is taking cutting edge, ecological restoration knowledge to schools across Australia and the world.

Take a virtual tour of the island, meet a scientist, or zoom up the nasal passages of the 3D skull of a quoll. Participants to this workshop will gain hands-on experience of a multifaceted education resource for primary school students in-person from biologist Wendy Payne, with ecologist and science communicator Mandy Bamford and teacher and education consultant Nathan Ducker joining online.

Target Audience: primary (R-6)

2.15D Accessing and analysing real Earth science data - DOUBLE SESSION PART 2

Katy Buffinton and Tamara Sullivan, Geoscience Australia

Data and science inquiry go hand-in-hand. Geoscience Australia has vast amounts of raw and processed data that school communities are relatively unaware of; during this workshop participants will learn where to find different types of surface and subsurface data and immerse themselves in case studies ready for classroom use.

Using their own devices teachers will become familiar with Earthquakes@ga.gov.au and the rich data within it regarding earthquake observations. We will also investigate Digital Earth Australia (DEA) and the access it provides to 30+ years of Landsat satellite observations from space. Powerful tools have been created with applications in bushfire control, wetlands monitoring, flood risk and tracking coastal changes. You will learn how to quiz the data about water cover and create graphs with a click, how hotspots detection supports bushfire monitoring, and to see detailed changes to the Australian coastline over recent decades. Participants will learn how to access, manipulate and link a series of images into a 'story' for teaching purposes or for students to use as reports. We will also discuss potential for local inquiry case studies, further investigations, data downloads and exam applications.

Participants will go away with a better understanding of the geological and geographical data available from Geoscience Australia, how this data may be used in classroom inquiry activities and how to enable students to access, manipulate and present the data for themselves.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary

2.16D Differentiation of Tasks in AC 7-10 Science - DOUBLE SESSION PART 2

Jason Greenslade, Westminster School

Differentiation is critical to meaningful task design for the modern student. We will discuss different ways to differentiate both practicals and assignments in Science so that the range of learners can access tasks.

Focus will be on AC Year 7-10 in Science.

Target Audience: junior secondary (7-10)

Quantum for Educators

The What, Why, When & How-We-Can-Help-You of Quantum

Session 4.8
Tuesday 11 July
3:30-4:30 pm



EQUS

Australian Research Council
Centre of Excellence for
Engineered Quantum Systems

Or visit us at booth 5 at the Trade Display!

equs.org | @ARC_EQUS

DEDICATION TO ROY STANHOPE

CONASTA's cornerstone plenary event, the Stanhope Oration, is presented in memory of Roy Wilson Stanhope who had a profound effect on the development of science teachers' associations around the country and in particular, ASTA.

Early Career

Born on 25 January 1902, Roy Stanhope began his 22 years of teaching in high schools in 1925 in Petersham NSW where he taught maths and science, and moved on to other high schools in NSW.

He served on the Chemistry syllabus committee for several years in the 30s, was an assistant examiner for the NSW Intermediate Certificate of Elementary Science, the Intermediate Certificate of Physics in 1939-40 and 20 years later, NSW leaving Certificate in Chemistry and Chemistry Honours. In addition to his school teaching he lectured in the physical sciences at Sydney Teachers' College where for the last 17 years there he was head of the Chemistry Department. He was also a senior lecturer in science education and a lecturer in chemistry and physics in post graduate courses at the NSW College of Nursing from 1950 to 1967.

Early travels

Stanhope's early travels as the NSW Teachers' Federation Overseas Travelling Fellow, took him to Britain and the United States of America, where in 1938 he incorporated a one-year post-graduate study at Stanford University.

In the elementary schools he had visited he noted that attempts had been made to substitute a true elementary science for what had been nature study and that at junior secondary levels, a three year sequence of general science was offered. At high schools offering a four-year course, general science was compulsory for the first year and was followed in subsequent years by some specialisation.

Roy Stanhope was a strong advocate of general science and in his conclusion to the second of the three addresses he made a number of suggestions regarding a general science program. Stanhope — and remember this is in 1945 — said that the program should be planned to contribute effectively to the two principle aims of science teaching as an integral part of science education. These were:

- the acquisition of an understanding knowledge of those scientific facts and principles of importance in everyday living, and
- the ability to apply the scientific method in the solution of personal, civic and national problems.

Another of his points, very radical for the times, was that a program should be built upon a true elementary science course taught throughout the primary grades.

Relationship to ASTA

In 1945, Stanhope made another set of ten recommendations urging reforms to science education. These were far ranging and far-reaching. They had to do with radical reforms to teacher training, making science courses relevant and emphasising the need for proper laboratory and clerical assistance.

One of the ten recommendations is especially significant to ASTA. It has two parts:

- that a national association of science teachers should be formed, and
- that as one of its responsibilities it should set up the publication of an Australian Science Teachers Journal.

After repeated urging by the president of WA Science Teachers Association, Jack Oates, ASTA was founded in May 1951 during the time of the Congress of the Australian and New Zealand Association for the Advancement of Science (ANZAAS).

First CONASTA

The first ASTA conference was a single evening session devoted to its formal foundation, the adoption of a constitution and an address by Stanhope on American Science Education. 40–50 members were present and it is from this beginning that we have grown to what we are now. 1951 also saw the revival of the NSW Association and the establishment of the SA Association largely stimulated into existence by Roy Stanhope's earlier visits to Adelaide.

Formation of STAs

Over a period of time, Stanhope had corresponded with teachers in Tasmania and had aroused their interest in the possibility of forming a State Association. This became a reality in 1952 when the Tasmanian Science Teachers Association was formed.

In 1946, the Queensland Science Teachers Association was formed following encouragement by Stanhope who was teaching in northern New South Wales.

Roy Stanhope contributed to the establishment of three state associations and of course the national one, ASTA. He held offices in his state association having been secretary and serving five terms as President. He was also President of ASTA in 1966.



Australian Science Teachers Journal

It was not until the conference of 1953 that Hugh McKnight of STAV coined the acronym CONASTA and it was at CONASTA 4 the following year that Roy Stanhope's second part to the WA recommendation of 1945 was realised – the decision to launch the Australian Science Teachers' Journal in 1955. Roy Stanhope was its sub-editor for NSW from its first issue in 1955 until 1967 when he officially retired.

Stanhope published prolifically. He was responsible for publishing the Teaching of Chemistry in NSW and USA in 1932. He was also responsible for the first standardised test in any secondary school subject published outside of the United States.

Roy's vision

Roy Stanhope's vision is our vision and the leadership, dedication, enthusiasm, perseverance and expertise shown over such a long time have been acknowledged by the awarding of:

- life membership of the NSW Science Teachers Association (STANSW) in 1965;
- life membership of the Queensland Science Teachers Association (STAQ) in 1979; and
- life membership of ASTA in 1964.

He was also awarded fellowships of the Australian College of Education in 1967 and in 1989 the Order of Australia for services to education, especially science.

Recognition for Roy's contribution

In 1967, ASTA Council determined that the major address at each annual conference be named the Stanhope Oration in recognition of Roy Stanhope's contribution to the science teaching profession.



Stanhope Oration

MONDAY 10 JULY

4.20PM - 5.20PM | BRAGGS LECTURE THEATRE

DR KRISTIN ALFORD

Dr Kristin Alford is a futurist and the inaugural Director of the future-focused museum MOD. at the University of South Australia. At MOD. Kristin leads a team of science communicators and designers developing immersive experience to showcase research and innovation to young adults. This work has been recognised by awards from the Asia-Pacific Network of Science Centres and the Australian Museums and Galleries Association.

Kristin is a member of the Accreditation, Recognition and Certification Committee for the South Australian Certificate of Education Board, and the Art & Culture Advisory Board for Lot Fourteen. She is actively involved in national and international science centre and museum networks and a globally recognised speaker on futures of emerging technologies. Kristin holds a PhD in mineral process engineering from the University of Queensland and a Masters of Management in Strategic Foresight from Swinburne University.

Previously she founded foresight agency Bridge8 where she led a team building foresight capability and developing emerging technology communications in domains including water sustainability, climate change, nanotechnology, education and health. She was the inaugural licensee and host of TEDxAdelaide and lectured foresight and social change at the University of Adelaide. She has had various careers in engineering, human resources, strategy and product development for companies including BHP Billiton, Ansett-Air New Zealand, the Royal Agricultural Society of Victoria and Nanotechnology Victoria. In her spare time she volunteers with Rowing SA as a Boat Racing Official.



Stanhope Oration

The purpose of MOD. is to showcase research at the intersection of science, art & and inspire young people how to navigate their futures. In the implementation of our vision, the priorities of Stanhope can be seen – that the acquisition of science principles is important, that the application of this skills to problems is essential and that networks nurture the advancement of this cause. This oration will consider the ongoing importance of science education through the lens of informal learning at MOD. and the emerging skills and capacities needed for the future.

**Stanhope Oration
Presenting Partner**





9.00AM - 10.00AM

BRAGGS LECTURE THEATRE

PROFESSOR CHRISTOPHER DANIELS

Professor Christopher Daniels has been an incredible force in popularising nature education in South Australia. The university academic and government scientist has presented on ABC Radio for two decades. He started with fortnightly backyard wildlife segments in 2003 and, since 2007, presented many community programs on urban environmental science. Whilst his primary area of interest is in citizen science and ecoliteracy, Chris also works with a large number of allied education delivery organisations including the Marine Discovery Centre, Cleland Wildlife Park, the SA Museum (Board member) the Junior Field Naturalists and Nature Play (ex Board chair). Christopher was a driving force in Adelaide becoming a National Park City and also uses the arts to promote conservation. Christopher has written 11 award winning books including a children's book, Koala, produced a musical theatre show on koalas, delivered comedy for the Adelaide Fringe with South Australia's Science Media Centre, and advocates for numerous South Australian nature authors.



Now chair of the Green Adelaide Landscape Board, and a member 30 other Environmental Boards and committees, Christopher received a Doctor of Sciences from Adelaide University in 2019. He holds adjunct professorships at the University of South Australia and University of Adelaide.

Developing an ecoliterate community through nature education programs

One of the consequences of burgeoning populations together with rapid advancements in technologies that enable our daily life have led to a shrinking connection with nature and natural processes and so a decrease in ecoliteracy. We have demonstrated that a number of factors form the foundation of ecological literacy. These factors are:

1. Education and in particular education that includes science based subjects or disciplines;
2. having a healthy relationship with place such as growing up or living in communities where people are connected with each other and with their natural environments;
3. spending time in nature and having opportunities for regular engagement with nature and the outdoors;
4. participating in activities that encourage or facilitate understanding nature;
5. and living in communities or households where the natural world is valued.

However, delivering nature education is itself a wicked problem because the term has different meanings for everyone and also varies with delivery modality. For example nature education can be delivered through:

1. Formal classroom style actions.
2. Nature Play.
3. Citizen science.
4. Broad-scale community engagement (eg via National Park City concept).
5. Engaging Aboriginal knowledge and pedagogy.
6. Nature-based and other festivals.
7. Other external informal education forums.
8. By aligned institutions.

Because nature education is fundamental to creating an ecoliterate community, it is a priority of Green Adelaide and our goal is to inspire communities to value, connect with, and care for nature. This presentation will discuss how Green Adelaide partners to deliver across the wide spectrum of learnings and knowledge exchange to reach its goal of creating an ecologically literate community in an urban context.

Keynote Presentation
sponsored by CSIRO



Workshop Outline - Tuesday 11 July



OFFSITE EXCURSIONS & WORKSHOPS

Delegates will have the opportunity to explore a range of cultural, scientific and health organisations along North Terrace with our offsite excursions & workshops. The close proximity of venues to the Conference venue and the free tram will make it easy for delegates to access these sessions, with a couple of sessions still held on the University of Adelaide Campus.

10.40AM - 1.10PM

OW1	Investigating Earth Systems Interactions in the First Creek Wetlands	Adelaide Botanic High School
OW2	Life by a Whisker – Implementing Citizen Science into the Australian Conservation in the Classroom	Adelaide Zoo
OW3	Critical and Creative thinking - where art and science overlap	Art Gallery of South Australia
OW4	Visit the Australian Space Discovery Centre	Australian Space Discovery Centre
OW5	Project Space Botany & Gamifying a Botanic Gardens Collection	Botanic Gardens and State Herbarium
OW6	"It's the small things", with Charles Darwin	HeapsGood Productions
OW8	Introducing FLEX	MOD.
OW9	Future of Food Deep Dive: What might we be eating in 2050?	Post Dining
OW10	Using the 'e' in STEM to bridge key learnings in Science, Technology and Maths	Questacon
OW11	SA Museum Science Research Tour	South Australian Museum
OW12	360° Flinders Ranges: fossils, landscapes, climate change and Earth history revealed through an immersive VR experience in support of World Heritage	University of South Australia, ProjectLIVE
OW13	Wine Discovery Centre <i>*additional cost involved</i>	National Wine Centre
OW14	Discover Adelaide's BioMedical Precinct	Fusetec & SAHMRI
OW15	Mind-Bending Light	The University of Adelaide

All delegates registered for these sessions will receive an email with the details of your meeting point and any other details you need for the workshop.



TEACHING YOUNG AUSTRALIANS ABOUT WHERE THEIR FOOD & FIBRE COMES FROM

Through a range of classroom resources and online platforms, PIEFA engages schools and students through real-world connections with farmers, foresters and fishers, educating about primary industries production and careers.



FIND OUT MORE

Workshop Outline - Tuesday 11 July



2.20PM - 3.20PM

		Room
3.1	Future of Food: What might we be eating in 2050?	Horace Lamb 422
3.2	Inspired by their Gift - Innovating the Curriculum for our Exceptional Learners... and how to survive it?	Barr Smith South 1062
3.3	Gel Electrophoresis for separation of DNA, Protein and dyes	Braggs 340
3.4	Bridging the gap between high school and research	Barr Smith South 1063
3.5	Physics Playground - Exploring High School Physics	Braggs 350
3.6	Innovation in Australian astronomy	Barr Smith South 2040
3.7	Using real-world science to spark inquiry learning	Barr Smith South 2032
3.8	Ediacara as a resource in secondary education	Hughes 322
3.9	Score the trifecta! Skills, content and outcomes in secondary Science	Barr Smith South 2051
3.10	Student agency and information reports - from regurgitation to creation	Barr Smith South 2052
3.11	Developing Spatial Reasoning in 3D	Barr Smith South 2060
3.12	The science of storytelling... And the storytelling of science	Hughes 323
3.14	What's next for Primary Connections: new digital design and embedded just-in-time professional learning	Ingkarni Wardli 7.15
3.15D	Constructing Communities with Architecture and Civil Engineering - DOUBLE SESSION PART 1	Ingkarni Wardli B17
3.16D	Gamification - the solution to engaging STEM teaching and learning! - DOUBLE SESSION PART 1	Ingkarni Wardli B18

3.30PM - 4.30PM

4.1	Citizen Science in the Classroom: Engaging Students with Real-World Projects	Horace Lamb 422
4.2	Partnerships that Innovate - STEM Professionals in Schools in action	Barr Smith South 2032
4.3	The evolution of disaster resilience education	Ingkarni Wardli 7.15
4.4	Microbiology for Independent Learning Projects	Braggs 340
4.5	Middle Years Science Data Logging - It's fun & easy!	Braggs 350
4.6	Get your students into Space...Space Schools in Australia	Hughes 322
4.7	Hydrogen Racecars: A Roadmap to Decarbonisation	Hughes 323
4.8	Quantum for educators	Barr Smith South 1062
4.9	Keeping the Humanity in Technology	Barr Smith South 1063
4.10	Self-paced, mastery based learning in a blended environment	Barr Smith South 2040
4.11	Collaborative Creative Practices	Barr Smith South 2051
4.12	Creating a quantum spark. A hands-on guide for primary-lower secondary teachers to have the confidence to teach quantum physics.	Braggs 313/314
4.13	Fun with energy	Barr Smith South 2060
4.14	Hands-on High School Chemistry with Tiny Science Lab	Barr Smith South 2052
4.15D	Constructing Communities with Architecture and Civil Engineering - DOUBLE SESSION PART 2	Ingkarni Wardli B17
4.16D	Gamification - the solution to engaging STEM teaching and learning! - DOUBLE SESSION PART 2	Ingkarni Wardli B18
4.17	SETA Forum	Napier 1.08

OFFSITE EXCURSIONS & WORKSHOPS

10.40AM - 1.10PM

OW1 Investigating Earth Systems Interactions in the First Creek Wetlands

Bronte Nicholls, Adelaide Botanic High School

Participants will have the opportunity to conduct an investigation into the water quality of the 4 ponds in the Adelaide Botanic Gardens Wetlands. They will conduct a range of physical, chemical and biological water quality tests and analyse the results to conclude the suitability for aquifer storage. They will also observe and discuss how the Earth Systems interact at this site. The purpose of this workshop is for teachers to consider how they may use a similar water source near their school as a field study site to develop science inquiry skills in Australian Curriculum Science or as an example of an Investigation or Earth Systems Study in Senior Secondary Earth and Environmental Science.

Please bring wet weather gear / umbrella, closed shoes suitable for walking on uneven ground, mobile phone for data collection.

OW2 Life by a Whisker – Implementing Citizen Science into the Australian Conservation in the Classroom

Jade Lauer, Adelaide Zoo

Come along to Adelaide Zoo for a screening of the Life by a Whisker documentary; an intimate journey inside a colony of Australian Sealions. The session will include observing a sealion training session with a keeper, learn about the conservation work being undertaken by the Marine Coordinator for Western Eyre National Parks and workshop with other teaching professionals about how you can bring conservation into the classroom.

OW3 Critical and Creative thinking - where art and science overlap

Kylie Neagle, Art Gallery of South Australia

Art and science share many similarities that are sometimes overlooked, particularly when we consider core capabilities that underpin both disciplines - critical and creative thinking. Works of art in particular can also be great vehicles for honing our observation and analysis skills. This session will focus on using works of art to develop our ability to look, analyse and interpret visual information - no art experience or knowledge required.

OW4 Visit the Australian Space Discovery Centre

Alice Fairey, Australian Space Discovery Centre

The Australian Space Discovery Centre is delighted to invite CONASTA delegates for an exclusive session at our Centre on Lot Fourteen.

Come and explore our Space Gallery, learn about Australia's growing space industry through our Mission Control Theatre and Careers and Info Hub, and discover why we think space is one of the best vehicles for modern STEM education and engagement.

This session includes:

- An introduction to the Australian Space Discovery Centre and Australian Space Agency
- An example of a presentation that would be delivered to visiting students
- A deep-dive presentation on one of our favourite space topics
- An opportunity to explore our current student workshop offering resources
- And plenty of time to dive in to the interactive Space Gallery, uncover new pathways at the Careers and Info Hub, and chat with our friendly Space Communicators, to find your place in space.

OW5 Project Space Botany & Gamifying a Botanic Gardens Collection

Mak Djukic, Botanic Gardens and State Herbarium (BGS)

In this hands-on workshop, join Botanic Gardens of South Australia's Education team in the gamified problem-based learning 'Project Space Botany' experience and use their iPad app to help design a biodome to survive living one year on Mars using plants! Then discuss elements of gamification and the creative process behind it that might inform classroom teaching.

BGS will provide an iPad with their Project Space Botany app preloaded. Participants will be exploring the Bicentennial Conservatory and on their feet for around half an hour, before a debrief nearby. The terrain is flat, however the Conservatory has an elevated upper walkway. The iPad app has an in-built screen reader to aid accessibility.

OW6 “It’s the small things”, with Charles Darwin

Michael Mills, HeapsGood Productions

Look around you, what do you see? Now look again! What don’t you see? You often don’t see the small, the tiny or the itty-bitty creatures which make up most of the living things that inhabit the Earth. And not only do they inhabit it, they rule the world! Come on a delightful journey into the world of the tiny with award-winning writer performer Michael Mills as Charles Darwin, on a walk through the nooks and crannies of Adelaide Botanic Garden. In an interactive musical adventure amongst some of the world’s most delightful plants, it won’t be long before you realise that it’s the small things, after all, that matter!

OW7 Bringing Science to Life with Virtual and Augmented Reality

Daniel Becker, Lumination

Immersive technology is transforming the world of work, and thus must be integrated into education to best prepare our students for the future. In the medical field, surgeons are using virtual reality to train for difficult operations, in biology, immersive technology is improving the learning of tasks that require spatial and visual memory, and in chemical engineering, as a visualisation tool for viewing 3D models of processes.

Teaching tomorrow’s workforce in the digital age can be made more successful by embracing the new technologies available, presenting a wealth of opportunities for teachers to unlock student learning potential in STEM. Using Virtual Reality (VR) and Augmented Reality (AR) in science, students can better conceptualize difficult to understand concepts, inspiring creativity and sparking student imagination.

Lumination is at the forefront of this technology and sets out to revolutionise the way we teach, learn and work.

Attendees will embark on an incredible journey at the Lumination Learning Lab, where they’ll be immersed in a cutting-edge, interactive environment designed to showcase the power of VR/AR technology in revolutionizing science education. With hands-on demonstrations, they’ll see how these innovative tools can bring the Australian Science Curriculum to life, fostering student engagement and retention like never before. By the end of the experience, attendees will be inspired to adopt a fresh and dynamic approach to teaching science, elevating student learning outcomes and propelling our students towards a bright and technologically-advanced future.

OW8 Introducing FLEX

Dr Dylan DeLosAngeles, MOD.

Teachers will meet the MOD. exhibition team and other teachers for an exclusive workshop and tour of the current FLEX exhibition. In FLEX, your capacity for pain will be put to the test and your perception of risk will be gauged. Still interested? You will also be able to alter your form and find ways to play, use your breathing to journey through an immersive deconstructed landscape, navigate ethical challenges, and more! The workshop and tour are opportunities for teachers to learn about the FLEX exhibition themes, unpack the exhibits, and make links for their classrooms. All participants receive a professional development certificate for 1.5 hours.

Are limits made to be pushed? We dare you to find out.

OW9 Future of Food Deep Dive: What might we be eating in 2050?

Hannah Rohrlach and Steph Daughtry, Post Dining

Using contemporary creative arts combined with science and technology, Post Dining’s scenario-based workshops are designed to inspire participants to engage with sustainable and healthy food practices by exploring what and how we might be eating in the future. This hands-on workshop will present a range of activities designed for delivery in schools, providing curriculum-linked content ideas to take back to your classrooms.

Participants are invited to engage in an interactive journey through four alternate future food scenarios including: Growth, Restraint, Catastrophe and Transformation. Each future has been adapted from research completed as part of the Australian Academy of Science Future Conversations project. The workshop will include food tastings, original audio and video and interactive digital technology exploring the following themes: food technology and its implications for climate change; the water footprint of foods in a world with limited natural resources; and ecologically resilient foods such as insects and weeds.

Post Dining recognises that conversations around climate change are often disempowering, leaving adults and young people with a genuine anxiety for the future. As artists, we see the value of creative practices in illuminating a more hopeful perspective and path towards more positive futures. This workshop offers an opportunity to think, taste and discuss concepts, questions and activities which will allow you to creatively consider what the future might taste like in an empowering way.

This workshop has been developed with financial support from Creative Partnerships Australia and the Suzanne Elliot Trust.

OW10 Using the 'e' in STEM to bridge key learnings in Science, Technology and Maths

Questacon's Educator Programs Team

Australia and the world will increasingly be seeking solutions for economic, political and environmental challenges in coming years. Engineering skills will be critical to solving these challenges. As such, we need to prepare our students by increasing their ability to develop innovative solutions through problem solving.

Questacon's Education Programs Team have developed and delivered the Engineering is Elementary (EiE) Australia program over the last 4.5 years. During this interactive workshop, utilising simple materials, you will be shown how to implement easy, cross-curricular engineering into your classroom! By the time you leave, you will have:

- An introduction to the EiE program and the structure underpinning its development
- Explored a task involved in the EiE program that could be immediately implemented in your classroom with direct links to the Australian Curriculum, and
- An opportunity to discuss the application of inquiry in classrooms with other educators.

Expand your students' experience of STEM and the design process through an inquiry-based approach, deliver powerful learning opportunities and leverage these opportunities to deepen your student's knowledge in any subject! Elements of the EiE programs have been used from early childhood to secondary classrooms, and even into tertiary programs; as the content and approach is flexible and relevant to all learners. Best of all, it's free for teachers and schools to get involved...come and join the engineering revolution!

OW11 SA Museum Science Research Tour

Keith Maguire, Heidi Lomax, South Australian Museum

The SA Museum invites members of CONASTA 70 to take a behind the scenes and front of house tour with the researchers and educators at the SA Museum. Explore behind the scenes to see the research, collections and scientists that are at the nexus of science research and education at SA's Premier Museum. This tour will be in 2 parts with an hour spent in the SA Museums Research Centre with its biological and geological collection managers, and another hour spent in the museum with the Museums education team taking you through its galleries and resources.

OW12 360° Flinders Ranges: fossils, landscapes, climate change and Earth history revealed through an immersive VR experience in support of World Heritage

Professor Tom Raimondo and Dr Lily Reid, University of South Australia, ProjectLIVE

The Flinders Ranges are arguably one of Australia's greatest geological wonders. Six hundred million years of geological transformations are exposed as the pages of Earth's past, revealing the rise and fall of mountain ranges, the dramatic changes in climate and landscapes, the appearance of Earth's first animals, and even a giant meteorite and a superheated geyser thrown in for good measure! The region is truly a working laboratory for Earth and Environmental Science students, educators and researchers.

With such a vibrant history of exploration and education, the extraordinary global significance of the region is now taking centre stage. The Flinders Ranges have taken an important step towards gaining UNESCO World Heritage status after being nominated on Australia's Tentative List for World Heritage. To open up its education potential to a global audience, the remarkable history, cultural heritage and scientific value of this iconic landscape have been unlocked through an immersive virtual experience produced by the Project LIVE team at the University of South Australia, freely available at projectlive.org.au/360-flinders-ranges.

The 360° Flinders Ranges VR experience forms an integral part of a new curriculum resource for Year 8 students developed by the SA Science Teachers Association (SASTA), the Flinders Ranges Ediacara Foundation and SA Department for Education. From 2023 onwards, secondary science teachers will for the first time have the resources to teach local content about the Ediacaran fossils and the Flinders Ranges as part of the Australian Curriculum for Science, including 3D reconstructions of several Ediacaran animals and a virtual swim through the ancient seabed created for the VR experience. All details about the curriculum resource are available in the latest issue of the SASTA Journal.

Join Professor Tom Raimondo and Dr Lily Reid as they discuss how this STEM initiative came together, how the curriculum resource can be applied, plus share some behind-the-scenes footage and a sneak peek at what else is in the works. Then put on a headset and take a virtual tour of the Flinders Ranges yourself, adventure awaits!

OW13 Wine Discovery Centre

National Wine Centre

Take a guided tour of the National Wine Centre's Wine Discovery Journey. Uncover the diversity of Australia's 65 wine regions and meet some of the wonderful characters of the industry.

Learn how to blend your own award-winning wine with our virtual blending simulator and discover the key characteristics of the key wine varieties grown throughout the country.

60 min session. Guided tour of the National Wine Centre's Wine Discovery Journey, and find out about the history, culture and science of Australian wine. Followed by a tasting of local wines.

Please note: there is a \$40 cost for this workshop. If you select this workshop, you will be sent an invoice for payment separately.

OW14 Discover Adelaide's BioMedical Precinct

Fusetec & SAHMRI

Fusetec, Advanced Surgical Training Clinic

Fusetec, Advanced Surgical Training Clinic is a 25x bed surgical training clinic for residents and surgeons to rehearse complex surgical procedures, and continually upskill. Traditional surgical training has been the dissections of cadavers and living people. The clinic is a world first cadaver free surgical training environment, where surgeons can train without being exposed to potential harmful bacteria. The clinic demonstrates a new disruptive surgical training market where surgical training is risk free for all stakeholders.

South Australian Health & Medical Research Institute Tour

The SAHMRI cheese-grater building is one of Adelaide's most iconic buildings. Yet, the most amazing thing about SAHMRI is what happens inside. So, get into it. Hundreds of health and medical researchers collaborate to help every person not just live longer but live better.

SAHMRI's North Terrace headquarters has more than 5000 triangular windows. We want the people we work for – the community – to look in and ask about what we are doing. Get up close to the stunning architecture and see the life-changing work we're doing inside.

OW15 Mind-Bending Light

Ben Sparkes & Chris Perrella, The University of Adelaide

Light plays a significant role in our everyday lives, from bar-code scanning at the supermarket through to medical procedures and enabling future driverless cars. To explore a few of these uses, in this activity we will tour some of the cutting-edge optics labs at the University of Adelaide, follow by two hands-on activities developed by the South Australian branch of the Australian Institute of Physics, "Jelly Waveguides" and "Laser Radios", both of which focus on the important role light plays in high-speed global communications.

OW16 Innovation and future thinking at SA Water

Jade Cornish SA Water

Join SA Water to learn about the innovations and challenges in delivering water services across South Australia. In this workshop you will use design thinking strategies in a collaborative, project-based learning scenario to develop creative solutions to one of these challenges which you can take back to your classroom.

Learn more about:

- how we maintain drinking water quality and protect communities during extreme weather events
- what we're doing to ensure sustainable climate-independent sources of water for the future
- how we're helping create green spaces to facilitate community connection

Workshop Descriptions | Tuesday 11 July

SESSION 3 | 2.20PM - 3.20PM

3.1 Future of Food: What might we be eating in 2050?

Hannah Rohrlach and Steph Daughtry, Post Dining

Using contemporary creative arts combined with science and technology, Post Dining's scenario-based workshops are designed to inspire participants to engage with sustainable and healthy food practices by exploring what and how we might be eating in the future. This hands-on workshop will present a short sample of activities designed for delivery in schools, providing curriculum-linked content ideas to take back to your classrooms.

Participants are invited to engage in an interactive journey through four alternate future food scenarios including: Growth, Restraint, Catastrophe and Transformation. Each future has been adapted from research completed as part of the Australian Academy of Science Future Conversations project. The workshop will include food tastings, original audio and video and interactive digital technology exploring the following themes: food technology and its implications for climate change; the water footprint of foods in a world with limited natural resources; and ecologically resilient foods such as insects and weeds.

Post Dining recognises that conversations around climate change are often disempowering, leaving adults and young people with a genuine anxiety for the future. As artists, we see the value of creative practices in illuminating a more hopeful perspective and path towards more positive futures. This workshop offers an opportunity to think, taste and discuss concepts, questions and activities which will allow you to creatively consider what the future might taste like in an empowering way.

We are also presenting an extended workshop on Tuesday morning which will cover this content in more depth. These workshops have been developed with financial support from Creative Partnerships Australia and the Suzanne Elliot Trust.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

3.2 Inspired by their Gift - Innovating the Curriculum for our Exceptional Learners...and how to survive it?

Oliwia Derda, St Columba College

The graduating class of 2030 will navigate a world like no other. For this reason, we as educators are working to nurture bold and innovative thinkers ready to brave the complex challenges the future will have to offer. One cohort of students energised by the potential of facing these challenges is gifted learners - our top 10%.

Gifted students have exceptional intellectual, academic, and creative abilities, and nurturing and supporting their growth and development is essential. For this reason, they require a challenging, stimulating, and engaging curriculum to develop their talents and interests fully. This can include incorporating advanced or specialised content, providing independent research and study opportunities, and using technology and other resources to enhance the learning experience. The list goes on...

'Inspired by their Gift' is a practical guide of tried and tested academic extension approaches for gifted learners across Years 3 - 12. Speaking through the experience of building and surviving an extension program, we will navigate the challenges, celebrate successes and work together to develop a school environment that enriches academically while considering the personal and socio-emotional development of gifted learners.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

3.3 Gel Electrophoresis for separation of DNA, Protein and dyes

Jeannette Tran, STEM Reactor

In biotechnology, agarose gel electrophoresis is the cornerstone DNA separation technique. More recently, exciting innovations in the use of agarose gel electrophoresis are now enabling students to also engage with and explore both native and denatured protein separations using the same equipment previously used for DNA separation. This has significant implications for the classroom. This 'nuts and bolts' hands-on workshop explores the fundamental concepts and principles of agarose gel electrophoresis and its basic application in DNA and protein separation, as well as introducing more advanced applications. Participants will be exposed to a range of cost effective equipment, from home-made through to cutting edge and learn how to:

- Prepare, set up and manage classroom activities
- Prepare and run dye, DNA, RNA and protein samples
- Visualise, record and analyse results
- Troubleshoot

The workshop is structured to allow continuous opportunities for discussion, to enable participants to explore the options that best address their needs. Participants will leave the session with the knowledge, practical skills and confidence to enable them to manage their students' use of the technology in routine DNA and protein separations as well as for experimental investigations. Written resources are provided.

Target Audience: senior secondary (10-12), lab officers, tertiary

3.4 Bridging the gap between high school and research

Suren Mendis, Australian National University

The meriSTEM platform consists of a range of free teaching resources for year 11 and 12 science teachers. The initiative was created in 2014 by academics at the Australian National University, looking to help high school teachers. Since then, the program has grown to encompass multiple subject disciplines in year 11 and 12. While this initiative has helped teachers in numerous ways, one of its most valued benefits is the capacity to connect high school students to research. Numerous videos on the meriSTEM platform include researchers talking about their work, allowing students to be at the cutting edge of research while engaging in learning. This session provides details of meriSTEM's continued commitment to helping students connect to science research, as well as some of its new developments. Participants will get a sneak peak at meriSTEM's upcoming resources and will have opportunities to suggest further additions, to help shape the future directions of this program. Finally, participants will learn how to access meriSTEM's free bank of resources, including teaching videos, classroom activities and quiz banks.

Target Audience: senior secondary (10-12), tertiary

3.5 Physics Playground - Exploring High School Physics

Stuart Lewis, Scientrific Pty Ltd

"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

Target Audience: junior secondary (7-10), senior secondary (10-12), lab officers

3.6 Innovation in Australian astronomy

Lara Sharp, ASTRO 3D

Astronomy is often thought of as gazing through the eyepiece of a telescope at the wonders of the Universe. However, modern astronomy includes not only optical astronomy but also radio and theoretical astronomy. Modern astrophysics (i.e. the physics of astronomical objects) is dependent on a raft of technological innovations (think James Webb Space Telescope!)

Modern astronomy and astrophysics are looking further into the past than ever before, which means collecting light that is progressively weaker and of different wavelengths (for example, James Webb Space Telescope operates in the infrared portion of the spectrum). These challenges are continually driving innovation in the fields of engineering, optics, software, computing and more.

Australia has a long history of inventing and building optical/radio telescopes for Australian facilities as well as for international observatories. On an international scale, we punch above our weight!

In this workshop, we will introduce the variety of observational technologies employed in astrophysics, and discuss the future careers your students might pursue in science and in industry. This material is applicable to both sub-strands of Science as a Human Endeavor, particularly the development of knowledge over time through the actions of many people and the Elaboration on generating new career opportunities in the study of the Universe.

You will also have a go at writing a telescope proposal - one of the most challenging (and rarely discussed) tasks that a professional astrophysicist ever undertakes...!

Target Audience: junior secondary (7-10), senior secondary (10-12)

3.7 Using real-world science to spark inquiry learning

Alexandra Clarke and Shane Hengst, CSIRO

Do you want to increase student engagement in your classroom using real-world challenges and science within an inquiry-based learning approach?

Do you want your students to do some of the heavy lifting in their own learning, or ask questions that ignite deep and meaningful discovery and discussions?

If this sounds like you, then join CSIRO's Education & Outreach team as we showcase the innovative work the national science agency is doing to tackle some of Australia's greatest challenges. Infusing inquiry-based learning with CSIRO science is an opportunity not to be missed.

This hands-on workshop will model a classroom application of the Question Formulation Technique, putting you in your students' shoes to inspire inquiries based around CSIRO's work. You'll walk out with a greater understanding of our nation's biggest goals in science research, along with strategies and resources that will help you implement inquiry-based learning in your classroom.

Target Audience: junior secondary (7-10), senior secondary (10-12)

3.8 Ediacara as a resource in secondary education

Diego Garcia-Bellido, University of Adelaide and South Australian Museum

We plan to offer the 555 million-year-old Ediacaran fossils of South Australia's Flinders Ranges as a means to communicate parts of the South Australian science curriculum in the areas of Biological Science and Earth and Space Sciences for years 6-11, and their applicability in undergraduate studies. These fossils will be an important component in the UNESCO World Heritage nomination of the Flinders Ranges.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary

3.9 Score the trifecta! Skills, content and outcomes in secondary Science

Stacey Martin, Edrolo

This session will help you examine and strengthen the links between Science skills, content, and student outcomes in 7-10, helping you to plan lessons that set your students up to pursue and succeed in Science in the senior years. Former Science teacher and senior Biology assessor, Stacey Martin, will walk through unpacking the progression of Science skills from 7-10 in Australian Curriculum 9.0, highlight opportunities for embedding and teaching content alongside building skills, and how to make curriculum-aligned lessons that scaffold students through the achievement standards. There will be opportunities to collaborate and co-plan lesson activities within the session.

Target Audience: junior secondary (7-10)

3.10 Student agency and information reports - from regurgitation to creation

Miriam Doull, Mitcham Primary School

Are you tired of students in your Primary/Middle Science classroom presenting the same old posters and slide presentations year-in-year-out? Do you find yourself mired in a mishmash of adequate information essentially regurgitated (but carefully not plagiarised) from the internet, often designed to impress you by including overly complex diagrams and text that they are unable to explain? Do you wish your students would present you with an information report that was as engaging as something by David Attenborough, Brian Cox, or even Phil McCordic from Science Max? Do some of them wish they could too?

By setting explicit Learning Intentions and Success Criteria, drawing on Literacy strategies taught in the English classroom, and using purposeful strategies to increase student agency, a subsequent increase in student engagement can lead to an improvement in learning outcomes and quality of work.

This session outlines key strategies and tools that I use to: increase student agency in the middle and upper Primary Science classroom; develop student skills in research and information synthesis; and encourage the production of creative information reports that demonstrate the depth of student understanding against Learning Intentions and Success Criteria.

Target Audience: primary (R-6), junior secondary (7-10)

3.11 Developing Spatial Reasoning in 3D

Mandi Dimitriadis, Makers Empire

Recent research has highlighted the important role that spatial reasoning skills contribute to future success in STEM learning, and STEM based careers. There is also evidence that spatial skills are malleable and can be improved with practice, particularly at a young age.

3D modelling is widely accepted as a great way to improve students' spatial skills and engage them in spatial reasoning.

Makers Empire recently partnered with the University of South Australia. to measure the impact of our 3D learning experiences on primary and middle school students' spatial reasoning abilities.

This presentation will unpack what spatial reasoning is, how we can embed spatial reasoning experiences into STEM learning and test out our own spatial reasoning skills with strategies that can easily be adapted to the classroom. We will share the exciting results of our research study and opportunities to be involved in future projects.

Target Audience: primary (R-6), junior secondary (7-10)

3.12 The science of storytelling... And the storytelling of science

Michael Mills, Heaps Good Productions

Communicating science requires us to understand that we do not engage with facts or data. It is in the nature of being human that it is stories we engage with. That being so, if you want to communicate science, and for it to be effective, you need to find the right narrative, otherwise, you're just hurling facts at people who will filter and interpret those facts within the context of their own values and biases. You might feel a smugness of knowing lots of things and hurling them into the universe, but the reality is that all you're doing is showing off.

Given this to be true, how, then do we construct an engaging scientific narrative? And what are the implications of this for teaching science to students and the broader community? At a time of fake news and with conspiracy theories abounding, what do we do?

In a workshop that asks attendees to participate in the storytelling experience, and delves into why it is that stories profoundly matter, award winning science communicator, writer, and performer Michael Mills will take you on a journey of discovery. It is a journey that delves into the most fundamental and important questions of why the telling of stories matters, and how we can begin to go about it effectively.

Target Audience: primary (R-6), junior secondary (7-10)

3.13 Forest Science Explorers Teacher toolkit - A Virtual Field Experience bringing EdTech to primary science

Beth Welden, ForestLearning - Forest and Wood Products Australia

A Virtual Fieldwork Experience is an inquiry-based teaching tool that allows you bring a real-world field site to the classroom. Through ForestVR's immersive, 360-degree forest video experiences and photo tours, students can take one or compare several virtual tours of forest landscapes that otherwise would be inaccessible, or impossible to achieve in a school field trip. These learning experiences, by design, are flexible, provide data about a field site and allow students to explore at their own pace.

This workshop unpacks, and allows hands-on experiences for, the newly launched and world-first Forest Science Explorers toolkit developed by ForestLearning and the Australian Science Teachers Association for Science Years 4 to 6. The unit embeds ForestVR's Virtual Fieldwork Experience for students to explore Australian forest lifecycles and the structural features and adaptations of trees.

The Forest Science Explorers six-lesson unit comes complete with easy step-by-step experiments and hands-on activities, teacher guides with answers, multi-media links, and a printable or online accessible student workbook.

Teachers attending the workshop will experience and learn first-hand the use and application of ForestVR in the classroom and use virtual reality (VR) headsets and other technology options. Teachers will also learn how ForestLearning can offer them a range of additional tools for science classrooms and beyond.

Forest Science Explorers is aligned to V9.0 Australian Curriculum:

YEAR 4 | ACSSU072, ACSSU073, ACSSU075, ACSHE062, ACMMG084

YEAR 5 | ACSSU043, ACMMG108, ACSHE081, ACSHE098, ACSHE083, ACSHE100

YEAR 6 | ACSSU094, ACMMG137, ACSHE081, ACSHE098, ACSHE083, ACSHE100

ForestLearning is an initiative of Forest and Wood Products Australia and provides teachers with free teaching resources aligned to the Australian Curriculum via the one-stop-shop web portal - forestlearning.edu.au - with a focus on Australian forests and sustainable timber production.

Target Audience: primary (R-6)

3.14 What's next for Primary Connections: new digital design and embedded just-in-time professional learning

Australian Academy of Science Education Team

A transformation of the Academy's Primary Connections program is underway and will include new features to help you plan and adapt lessons for all learners, as well as align with Version 9.0 of the Australian Curriculum.

In this session, you'll receive an exclusive preview of the reimagined Primary Connections website, featuring a new way for teachers to explore learning sequences, new approaches to help you support diverse student needs, and embedded just-in-time access to professional learning.

We'll explore the learning design behind these brand-new features as well as the ways in which teachers might engage with them to create custom learning for their students.

We're keen to hear your views about which aspects of the new resource would resonate in your schools, what else we should consider, and how you might use these features in your contexts.

Bring your own device to be amongst the first to experience our brand-new approach to supporting primary science and help us shape the future of Primary Connections.

Target Audience: primary (R-6)

3.15D Constructing Communities with Architecture and Civil Engineering - DOUBLE SESSION PART 1

Michelle McLeod, RiAUS and Dr Brendan Scott, The University of Adelaide

Join this session to grow your collection of hands-on STEM activities. The Royal Institution of Australia and the School of Architecture and Civil Engineering at The University of Adelaide are working in partnership to create a collection of curriculum connected design and build activities. This hands-on workshop session will demonstrate a range of interactive activities that showcase current and emerging research and highlight connections with STEM curriculum. These design and build activities provide hands-on student experiences; develop critical and creative thinking; engage group work and collaboration skills; and inspire deeper understanding of STEM study and career pathways. Participants will have the opportunity to move between activity stations that explore environmental responsibility; the urban water cycle; highlight current and emerging research and industry pathways; and investigate the sustainable development of communities - on and off world. Join us to explore how you can engage your students to better understand how they can play a role in constructing the communities of today and tomorrow.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

3.16D Gamification - the solution to engaging STEM teaching and learning! - DOUBLE SESSION PART 1

Suzy Urbaniak, Centre of Resource Excellence (CoRE) Learning Foundation

The CoRE Learning Foundation is setting out to modernise education. Our aim is to take learning outside of textbooks and classrooms and into the real world. To help achieve this goal CoRE has been working on an exciting project we are calling Gamifying Earth Science Learning. We have developed educational computer games created to be used as part of the Australian Earth and Environmental Science curriculum.

This workshop will showcase CoRE's two games, Resource, Respond, Rescue! which focuses on the mitigations and prevention of natural disasters and Old As Dirt! which represents the iron ore value chain from exploration to export and includes the creation of the banded iron formations via eight sub-games.

Target Audience: primary (R-6), junior secondary (7-10)

SESSION 4 | 3.30PM - 4.30PM

4.1 Citizen Science in the Classroom: Engaging Students with Real-World Projects

Tahlia Perry and Erinn Fagan-Jeffries, University of Adelaide and Sylvia Clarke, Murrylands and Riverland Landscape Board

Citizen science is a rapidly growing field where the general public work with researchers, government and policy makers to collect, analyse and interpret data for scientific studies. Not only does citizen science aid research at a larger scale but it has great education and engagement benefits for participants. More recently, citizen science is being used by teachers and embedded in curriculum to provide a unique and hands-on approach to learning science. Here, we will present citizen science projects that either have already been used in the classroom, or have the potential to be, including Insect Investigators, 1 Million Turtles, VegeMap and EchidnaCSI; all projects have a national level reach and can be implemented in a range of primary to high school level learning. We will also discuss adaptable data platforms like iNaturalist, which enable schools to run their own outdoor 'bioblitzes' and contribute scientific data to bigger programs, while the DigiVol and Zooniverse online platforms allow students to contribute to a range of local to international projects from within the classroom. We hope that teachers will leave with the confidence to incorporate citizen science into their classrooms and that this session will start meaningful conversations on how researchers and government can better incorporate citizen science into education across Australia.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12), lab officers

4.2 Partnerships that Innovate - STEM Professionals in Schools in action

Meg Spandler and Dr Maria Barrett, CSIRO

CSIRO STEM Professionals in Schools is Australia's largest skilled volunteer program for STEM professionals and school teachers from F-12. Teachers and STEM professionals are individually matched to form flexible, ongoing partnerships through which they explore real world STEM in innovative and creative ways to bring STEM to life in the classroom. Each partnership is unique as the partners determine what works best for them based on their combined expertise, the curriculum or student needs, and their availability.

Partnership activities are diverse and can range from mentoring teachers and students, providing hands-on demonstrations, career talks and presentations, to supporting specialist STEM clubs and student projects and hosting site visits or virtual lab tours.

These activities enhance teachers' and students' STEM skills, knowledge, and confidence.

In this workshop we will hear from South Australian teacher-STEM professional partnerships which have created a culture of innovative teaching and learning by bringing real-world STEM experiences into the classroom.

Hear how collaborating with an industry STEM professional has not only allowed teachers to grow, develop and embrace new experiences but has also inspired students through these school-industry connections.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

4.3 The evolution of disaster resilience education

Ella Wilkinson, Australian Institute for Disaster Resilience

The Australian Institute for Disaster Resilience (AIDR) is the National Institute for disaster risk reduction and resilience. A key component of AIDR's work is its Education for Young People Program, which promotes the development of disaster resilience education as a vital component in children and young people's learning.

Disaster Resilience Education (DRE) equips young Australians with the skills, knowledge, and confidence to take protective action before, during, and after an emergency or disaster. DRE promotes a vision of young Australians who are empowered to participate as active members in skilled and resilient communities, working to reduce the risk of disaster.

Adelaide, a National Park City, is an ideal location for students to study disaster reliance and risk reduction programs. With 95% of Adelaide residents living only 400 metres from open, green area, young people in the city need to be aware of how they can contribute to reducing the risk of disaster from natural hazards.

In Australia, Royal Commissions dating back to 1922 have called for young people to be taught about bushfires and hazards in school curricula. In the last two decades, we have seen disaster resilience education go from a topic of peripheral concern to a key priority in disaster risk management frameworks and strategies from the global to the local level.

This Cutting Edge Session will break down the key developments and changes in youth participation and engagement with disaster risk reduction (DRR) programs, the alignment of DRR to the Science domain in the Australian Curriculum 9.0, discuss detailed case studies of programs from schools across Australia, and provide attendees with extensive resources to develop their own programs in the science classroom and cross-curricular settings.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12), tertiary

4.4 Microbiology for Independent Learning Projects

Jeannette Tran, STEM Reactor

It is often challenging to design effective independent learning projects within the biology discipline. Microbiology offers a rich array of meaningful student-led learning experiences.

This session utilises a combination of discussion and hands-on. We will be exploring the ways you can use microbiology to bring biology practical teaching to life.

This session will explore practical components associated with:

- Serial Dilutions & Enumeration.
- Antibiotic Resistance
- Bacterial Transformation
- Safe investigation and characterising of soil bacteria.
- Water quality testing- chromogenic analysis.
- Bioremediation by oil eating bacteria.

Target Audience: senior secondary (10-12), lab officers, tertiary

4.5 Middle Years Science Data Logging - It's fun & easy!

Amanda Lovett, MTA

Breaking-down the barrier & simplifying electronic data collection and manipulation in middle years Science with simple, easy to run activities. Enjoy hands-on experiments using data-loggers, including simulating car accidents to demonstrate how airbags reduce impact forces, investigating the forces involved in Gonzo's bungee jumping adventure, the effect air resistance has on the velocity of falling objects and more! Curriculum-mapped experiments in stations for you to test.

Target Audience: junior secondary (7-10), senior secondary (10-12), lab officers

4.6 Get your students into Space...Space Schools in Australia

Mike Roach, South Australian Space School

Participants will learn about the history of Space Schools in Australia and the success of the South Australian Space School in introducing year 10 students to a career in the Space Industry. The South Australian Space School (SASS) was established in 1997 and has been run every year since then. Attendees at the presentation will be introduced to activities, excursions, and experiments that they can replicate to use in their own schools. They will be given access to teaching resources that specifically address the National Curriculum in Space Science and Astronomy and stimulate student interest and enthusiasm to consider a future career in the Space Industry. These experiments and activities have proven to be useful in classrooms ranging from years 5 to 10. The South Australian Space School is held twice a year in the school holidays for year 10 students and our aim is to encourage our graduates to continue their studies in Physics, Mathematics and Chemistry at year 11 and 12.

Participants attending this presentation will be given top priority to join an exclusive tour of Hamilton Secondary Space School (the home of the SA Space School) as the SASS 2023 students undergo a Mission to Mars. The tour will also include a visit to our STEM facilities and a presentation at our new Planetarium. The tour will be take place on Thursday 13th July on the morning following CONASTA 70.

Target Audience: junior secondary (7-10), senior secondary (10-12)

4.7 Hydrogen Racecars: A Roadmap to Decarbonisation

Phoebe Chilman, The University of Adelaide - Energy, Mining & Resources School Outreach Program

The energy, mining and resources sector underpins all areas of our modern society - from powering our cities and vehicles to the smartphones in our pockets. To sustain our society in addition to meeting global energy demands in line with renewable energy targets, critical minerals and transformative energy technologies will be required at an unprecedented scale.

South Australia is leading the nation in renewable energy resources and our race to decarbonisation. Hydrogen energy, specifically green hydrogen, is crucial for meeting our global net-zero emissions targets, with demand expected to grow six-fold by 2050. In this hands-on workshop, students will learn about green hydrogen production through the concept of proton exchange membrane (PEM) electrolysis and apply this in a practical setting to a hydrogen-fuelled race car. Tasked with investigating the application of green hydrogen to decarbonise our transportation industry, students will debate the pros and cons of their findings and whether hydrogen really is our fuel of the future.

Target Audience: junior secondary (7-10), senior secondary (10-12)

4.8 Quantum for educators

Dr Lachlan Rogers, ARC Centre of Excellence for Engineered Quantum Systems

The Australian Research Council Centre of Excellence for Engineered Quantum Systems (EQUS) is engineering the quantum future by building quantum machines that harness the quantum world for practical applications. This means solving the most challenging research problems at the interface of basic quantum physics and engineering, and translating our discoveries into practical applications and technologies. But that's not all we do; we're also passionate about sharing our work and our impact with the wider community. We've undertaken education and outreach through a range of public events and activities. Now, we're looking to engage Australian science teachers in our passion for quantum physics, with the goal of establishing more accessible content and, in the process, inspiring the next generation of quantum scientists and engineers.

In this interactive workshop, members of the EQUS team, led by Dr Lachlan Rogers, we will discuss and gather feedback on some of the resources and experiences that we think might help science teachers-such as support for extension science research projects, lab visits for students and/or teachers, research project ideas and support around quantum in the curriculum. Our goal is ultimately to develop resources and/or programs that will actually be used and be useful, and to do that we need to hear to the end-users-the teachers!

Target Audience: junior secondary (7-10), senior secondary (10-12)

4.9 Keeping the Humanity in Technology

Alison Kershaw, Inspiring SA

When we think of artificial intelligence and all that goes with it, what have been called cyber-physical systems such as robots, facial recognition and drones, images of the Terminator, Blade Runner and The Matrix spring to mind. In popular culture rarely does the introduction of AI or robots end well.

So how do we keep the humanity in technology and cyber-physical system that are able to accommodate humans, compute and the environment?

Framing great questions is the key to understanding any system and considering the consequences. Questions about the things we design, build and use, how they are regulated, managed, commissioned, decommissioned, who gets to make the decisions, how transparent is the system...the list of possible questions is potentially limitless.

The 3Ai Institute, now the School of Cybernetics at ANU developed 6 questions to help us take AI and cyber-physical systems safely, responsibly and sustainably to scale.

Considering these key questions, is starting point to helping ensure that humanity remains in technology. These questions can help not only find great solutions but help avoid what are euphemistically called 'unintended' consequences. Perhaps the consequences were unintended but could framing better questions have helped identify possible consequences so they could have been avoided?

The six questions are: Autonomy, Agency, Assurance, Interfaces, Indicators and Intent.

In this session Alison Kershaw, a graduate and now affiliate of the School of Cybernetics at Australian National University, will explore these questions and the role of framing good questions in helping us design, build and use new technologies that will create a future that looks less Blade Runner and more Big Hero Six.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary



4.10 Self-paced, mastery based learning in a blended environment

Rachel Peach, Inaburra School

Wouldn't you love to provide appropriate levels of challenge for every student in every lesson?

Meeting the needs of our students and building relationships so they feel safe, supported and empowered to learn is something we aspire to do as teachers. Rachel will outline an innovative framework which brings together self-paced learning and mastery based grading with blended instruction:

Empowered students take ownership of their learning and develop lifelong learning skills

Teachers are freed from being a 'sage on the stage' and become 'guides on the side'

Frequent checks for mastery provide formative assessment opportunities where students develop a growth mindset and reflect on how to take the next steps in their learning

In this presentation, you will see how self-paced learning can be set up with very little extra planning, how mastery grading can be simple, effective and powerful and how cloning yourself by using blended instruction can free you to work alongside your students guiding their learning.

It has the power to transform your classroom.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary

4.11 Collaborative Creative Practices

Danielle Weatherley, Unley High School

How can you have your entire cohort of Year 10s end up creating a collaborative piece of artwork using their understanding of Science and Mathematics?

This workshop will go through an example of how to create an immersive STEM experience that has clear links between Science, Mathematics and Art. Come with us on a journey of innovative content creation through a collaborative lens.

Together we will go through the processes that sat behind our collaboratively created unit, how this model can be applied in a traditional school setting and the benefits of designing an interdisciplinary STEM curriculum for staff and students.

Target Audience: junior secondary (7-10)

4.12 Creating a quantum spark. A hands-on guide for primary-lower secondary teachers to have the confidence to teach quantum physics.

Jason Major, Centre of Excellence in Future Low Energy Electronics Technologies

Built around a cross-curricula narrative of the quantum physics of electricity and its use in computing /technology, this workshop will inform and provide upper primary-early secondary teachers with the confidence to engage and teach their students about the principles of electricity and how it works at the quantum level. We will examine how this applies to one of FLEET's research goals to achieve zero-resistance (to be explained) and what this means for society and advances in computing. The session will include hands-on and critical thinking activities and constructive dialogue around some intriguing student reasoning around specific concepts such as resistance and the structure of atoms, and how to model these concepts at the quantum level. Caution dancing is involved.

Target Audience: primary (R-6), junior secondary (7-10)

4.13 Fun with energy

Jacqueline McCarthy, Abbotsleigh / STANSW

Teaching energy transfer with dominoes and marbles and transformation with car tracks, bow and arrows, torches and tuning forks is fun, memorable and accessible way for students to experience these concepts. This workshop would allow teachers to be involved in a range of hands-on activities wearing their "student hat" before being given the challenge - does a balloon have energy? Teachers will be asked to determine how many types of energy can be demonstrated using a simple balloon.

Target Audience: primary (R-6)

4.14 Hands-on High School Chemistry with Tiny Science Lab

Jacob Strickling, Tiny Science Lab

Using the Tiny Science Lab Chemistry Sets, participants will carry out a range of common experiments and demonstrations suited to High School Science.

Target Audience: junior secondary (7-10), senior secondary (10-12)

4.15D Constructing Communities with Architecture and Civil Engineering - DOUBLE SESSION PART 2

Michelle McLeod, RiAUS and Dr Brendan Scott, The University of Adelaide

Join this session to grow your collection of hands-on STEM activities. The Royal Institution of Australia and the School of Architecture and Civil Engineering at The University of Adelaide are working in partnership to create a collection of curriculum connected design and build activities. This hands-on workshop session will demonstrate a range of interactive activities that showcase current and emerging research and highlight connections with STEM curriculum. These design and build activities provide hands-on student experiences; develop critical and creative thinking; engage group work and collaboration skills; and inspire deeper understanding of STEM study and career pathways. Participants will have the opportunity to move between activity stations that explore environmental responsibility; the urban water cycle; highlight current and emerging research and industry pathways; and investigate the sustainable development of communities - on and off world. Join us to explore how you can engage your students to better understand how they can play a role in constructing the communities of today and tomorrow.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

4.16D Gamification - the solution to engaging STEM teaching and learning! - DOUBLE SESSION PART 2

Suzy Urbaniak, Centre of Resource Excellence (CoRE) Learning Foundation

The CoRE Learning Foundation is setting out to modernise education. Our aim is to take learning outside of textbooks and classrooms and into the real world. To help achieve this goal CoRE has been working on an exciting project we are calling Gamifying Earth Science Learning. We have developed educational computer games created to be used as part of the Australian Earth and Environmental Science curriculum.

This workshop will showcase CoRE's two games, Resource, Respond, Rescue! which focuses on the mitigations and prevention of natural disasters and Old As Dirt! which represents the iron ore value chain from exploration to export and includes the creation of the banded iron formations via eight sub-games.

Target Audience: primary (R-6), junior secondary (7-10)

4.17 Science education Technicians Australia (SETA) Forum

Wendy Shearer (QLD Science Technician) SETA

SETA seeks to provide an umbrella group to connect school science technicians across Australia. To provide a voice for school science technicians regarding issues at a national level. To encourage the sharing of ideas across state boundaries.

Find out what SETA has been working on to help you, ScienceASSIST and news from different state associations.

Stile

Always evolving

From pracs to printed booklets, teaching plans to talking points, activities to assessments, Stile is there for you with everything in one place. But, we know that every classroom is different. Customise any aspect to make it perfect for you and your students.

Our latest evolution, Stile X, scaffolds best practice note-taking while supporting students to implement effective study and revision skills. It's for the best bits done on paper.

Learn more about how we are evolving:
www.stileeducation.com



Keynote Speaker



WEDNESDAY 12 JULY

9.00AM - 10.00AM

BRAGGS LECTURE THEATRE

PROFESSOR TANYA MONRO

Professor Tanya Monro commenced as Chief Defence Scientist in March 2019. In this role she is head of Defence Science and Technology Group (DSTG) and Capability Manager for Innovation, Science and Technology for Defence.

In June 2022, Professor Monro was awarded a Companion of the Order of Australia (AC) for eminent service to scientific and technological development, research and innovation, tertiary education, and professional organisations.

Her previous roles include Deputy Vice Chancellor Research and Innovation (University of SA) and inaugural director of the Institute for Photonics and Advanced Sensing and the ARC Centre of Excellence for Nanoscale Bio Photonics (University of Adelaide).

Professor Monro is a Fellow of the Australian Academy of Science, the Australian Academy of Technology and Engineering (ATSE), the Optical Society of America and the Australian Institute of Physics. She also sits on the board of the Commonwealth Scientific and Industrial Research Organisation (CSIRO).



Keynote Presentation

The space domain has increased in significance for Defence in recent years. Hear from Tanya Monro, Chief Defence Scientist and leader of the Defence Science and Technology Group about the organisation's approach to space-based and space-enabled technologies, and attracting the workforce required to provide resilient space-based services direct to the warfighter to enable the Australian Defence Force to prevail in increasingly contested operating environments.

Space-based systems play a vital role in all ADF and coalition operations, wherever they occur around the world. From providing precise location information and situational understanding of the operating environment to enabling personnel and platforms to stay connected, assured access to satellite services and the freedom to operate in space are critical to the ADF's ability to protect and defend Australia's national interests.

**Keynote Presentation
sponsored by Questacon**





In a class of our own

At CSIRO, we support teachers and students to engage in real-world science.

As Australia's national science agency, we leverage our expertise to connect educators to cutting-edge STEM, through curriculum aligned programs and resources.

Whether you want to partner with a STEM professional, access engaging classroom resources, create culturally relevant lessons, recognise your students' potential or build your teaching capability, we have a team of education experts who can help you find the program or resources that are right for you.

Visit CSIRO at CONASTA or online
csiro.au/education



Australia's National Science Agency

Workshop Outline - Wednesday 12 July



10.40AM - 11.40AM

		Room
5.1	Creating a class full of scientists in 10 minutes	Barr Smith South 1062
5.2	Supporting student agency through Socratic Seminars	Barr Smith South 1063
5.3	Balancing the Equation: Gender Representation in Science	Barr Smith South 2040
5.4	Microscale chemistry	Braggs 340
5.5	10 strategies to find space to move and learn in science	Hughes 323
5.6	Engaging Students Through Real Astronomical Data	Barr Smith South 2032
5.8	"I hate science"... constructing new epistemic journeys in science education in schools	Horace Lamb 422
5.9	Dark Matter Detection: From the Lab to the Classroom	Barr Smith South 2051
5.10	Ediacaran Fossils	Hughes 322
5.11	Practical Science - Achieving the best outcome	Braggs 350
5.12	Teaching the language of Climate Change Science	Barr Smith South 2052
5.13	Ensnaring Everyday Events: Identifying Authentic STEAM in Daily Activities	Barr Smith South 2060
5.14	Meeting your students where they are: adaptive teaching and learning for access and equity	Ingkarni Wardli 7.15
5.15D	Teaching Science through the creation of interactive VR inquiries - DOUBLE SESSION PART 1	Ingkarni Wardli B17

11.50AM - 12.50PM

6.1	Identifying risks in popular laboratory experiments	Barr Smith South 1062
6.2	Using The Oliphant Science Awards to Teach Quality Science	Hughes 322
6.3	Car safety: Collisions and crumple zones	Braggs 340
6.4	Modelling STEM through Earth and Environmental Science	Barr Smith South 1063
6.5	Hands-on Chromatography	Braggs 350
6.6	(Outer) Space in Your Curriculum: Building Science Inquiry skills with data from space	Hughes 323
6.7	Being Curious: Bridging Gaps Between Numeracy and Science	Horace Lamb 422
6.8	Flippin' Booklets - Flipped Learning and Assessment	Ingkarni Wardli 7.15
6.9	Hands-on Science Activities for Lab Managers	Barr Smith South 2052
6.10	Educational satellites - Assembling and using CubeSats in class	Braggs 313/314
6.11	How to use iNaturalist to engage your students in nature and citizen science	Barr Smith South 2032
6.12	Teaching Chemistry through Minecraft	Barr Smith South 2040
6.14	On the Shoulders of Giants. Linking innovation and S.H.E.	Barr Smith South 2051
6.15D	Teaching Science through the creation of interactive VR inquiries - DOUBLE SESSION PART 2	Ingkarni Wardli B17

Workshop Outline - Wednesday 12 July



2.10PM - 3.10PM

		Room
7.1	How to invent stuff without becoming the evil genius type: Innovating responsibly	Barr Smith South 2032
7.2	Black Holes and Gravitational Waves: Contemporary Topics, Innovative Classroom Ideas	Barr Smith South 2051
7.3	A Healthy Land - Measuring the environment with Vernier dataloggers	Braggs 350
7.4	Chlorophyll Determination via Spectrophotometry	Braggs 340
7.5	Our place in space: connecting science to local communities and inclusive pedagogies	Ingekarni Wardli B18
7.6	UniSA STEM Innovation Experience (STEMIE)	Ingekarni Wardli 7.15
7.8	Space Education in Australia - Building Capacity	Hughes 323
7.9	The data doesn't lie - or does it?	Horace Lamb 422
7.10	Kids Teaching Kids: Peer learning to drive local action on environmental issues	Braggs 313/314
7.12	When the Pedagogy of Play meets Ambitious Science Teaching	Barr Smith South 2060
7.13	<p>SHARE-A-THON:</p> <p><i>An informal setting for multiple presenters to share innovative teaching ideas. Each presenter will share a strategy or tool during a 10-minute presentation and delegates will rotate around the room.</i></p>	
	Science Energisers	Barr Smith South 2040
	Change the World with Chemical Engineering	
	Harnessing the Power of Technology in the Science Classroom	
	The Science of Aboriginal Technologies	
	Electromagnetism teaching hacks	
	Health & Safety in the Lab	
	Favourite pracs	
	Soda water - Particle Theory and Gas Pressure	
	Creating a successful primary science learning community	
	Exploring Whiteboard	
	Future You - Science as a Human Endeavour embedded into teaching	
	Primary Science & Technology Integration in Nature Space Education	

Workshop Descriptions

Wednesday 12 July

SESSION 5 | 10.40AM - 11.40AM

5.1 Creating a class full of scientists in 10 minutes

Holly Kershaw, Arludo

Much of what students learn in science is invisible, and scientific concepts can be difficult for teachers to explain and students to understand. In this session, we'll demonstrate Arludo's approach to science which helps teachers focus on teaching scientific inquiry, hypothesis testing, experimental design, and data literacy. We've simplified science experiments by creating a library of free mobile apps that engage students and encourage them to interact with one another as scientists. As students are engaged in gameplay, our mobile apps collect data about the topic students are learning about, which we then aggregate and visualise for teachers to use in their lessons. This means that after 10 minutes of engaging gameplay, where students learn concepts through discovery, teachers have great data available to them to help students practice critical and analytical thinking.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

5.2 Supporting student agency through Socratic Seminars

Maria James, Victorian Curriculum and Assessment Authority

With an increasing trend towards supporting student independent learning skills, how can you make it work in your classroom? Socratic Seminars provide one way of assisting students to think critically about scientific ideas and to develop confidence in providing constructive feedback to their peers. Socratic Seminars engage learners in formal discussion and require active listening. They are particularly useful when setting group projects that require students to undertake their own background research, and can be applied from middle primary through to senior secondary years. Students may investigate one topic for the whole class, or multiple topics may be investigated. Socratic Seminars lend themselves particularly well to the exploration of socio-scientific issues; examples will be provided. This workshop will then step you through the stages of organising your own Socratic seminars as a trial run before you apply this teaching technique in your own classroom.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

5.3 Balancing the Equation: Gender Representation in Science

Kat Ross, IncludeHer and Curtin University

Students that can see themselves represented in education materials record higher levels of engagement and enthusiasm towards science. By creating lesson plans that celebrate the contributions of women and other minority scientists, we can address the biases and barriers that occur in STEM that hinder some students from pursuing a science career. We aim to inspire all students by incorporating a diverse array of role models within the current science curriculum.

The #IncludeHer in Schools program aims to actively address issues around gender biases in science by 1) bringing diverse science role models to students to increase engagement with science, and 2) to coach teachers in adapting their current science lesson plans to include more diverse, relatable role models for their students.

This workshop will provide information to help teachers examine current lesson plans and help them to develop strategies to incorporate diverse, relatable role models within their current content. Secondly, the combined results of this workshop and the #IncludeHer in Schools program will be used to develop online resources that are most useful to STEM teachers. These resources are designed to lessen the burden on teachers of creating their own new, diverse lesson plans.

Target Audience: senior secondary (10-12)

5.4 Microscale chemistry

Ginny Ward, Science ASSIST

Microscale chemistry is the scaling down in size of practical chemistry. Do more experiments in less time, use less chemicals and produce less waste. This workshop will support participants to conduct quick, small-scale chemistry in the classroom using various practical procedures such as electrolysis, precipitation and indicators.

Target Audience: junior secondary (7-10), senior secondary (10-12), lab officers

5.5 10 strategies to find space to move and learn in science

Lara Lang, Australian Science and Mathematics School and Angeline Buckler, Aldinga Payinthe College

This session will introduce how you can make the most of whatever learning space you have - from flexible open spaces, breakout spaces, labs, outdoors or classrooms - to support creative, active, collaborative, interdisciplinary and engaging learning in science.

With examples from two different schools, see how student engagement can be enhanced through intentional pedagogy. We will model physically active and collaborative strategies for science learning that aren't pracs or brain breaks, but incorporated into classroom learning.

From note-taking and class discussion to worksheets, watch how individual seated activities can be converted into active, engaging, collaborative and creative activities.

Target Audience: junior secondary (7-10), senior secondary (10-12)

5.6 Engaging Students Through Real Astronomical Data

Robert Hollow, CSIRO

Astronomy is a discipline in which real scientific data is freely and easily accessible. This makes it an ideal area for both first-hand and second-hand student investigations with the potential to undertake engaging and exciting projects. We explore local and international examples of where to access and how to use data to engage and challenge students. 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.

Target Audience: junior secondary (7-10), senior secondary (10-12)

5.7 A CubeSAT's Eye View of the Australian Space Industry - Exploring Opportunity through SHE Tasks

Liz Fairey, Open Access College and Alice Fairey, Australian Space Discovery Centre

What is the use of Science as a Human Endeavour tasks? More importantly, what CAN be the use of a SHE task? By working with some of the real humans of the space industry at the Australian Space Discovery Centre, senior science students have built a real connection with the possibilities of a STEM career.

By engaging in workshops at cultural institutions like the Australian Space Discovery Centre, students are given the opportunity to explore possibilities beyond the classroom. SHE tasks present an under-utilised opportunity to expand and extend this experience by encouraging students to further delve into the intricacies of applying concepts to increasingly real contexts. Experiences at cultural institutions can also make SHE tasks feel more human and real to students, as they have the opportunity to meet some of the people innovating in the topic they are investigating.

Liz and Alice will illustrate a case where the Australian Space Discovery Centre's Operation: Eyes on Earth workshop was successfully used to motivate a SACE Stage 2 Chemistry SHE task addressing monitoring the environment using earth observation. This case study is offered as a prototype for using other experiences from external providers as SHE task launchpads.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary

5.8 "I hate science" ... constructing new epistemic journeys in science education in schools

Sham Nair, NSW Department of Education

Negative and neutral attitudes to science are prevalent among high school students. Various studies have suggested that overburdened science syllabuses and unproductive teaching strategies conspire to create formidable obstacles for students to learn science meaningfully. Most science education researchers agree that the remedy to this problem lies in moving away from content-centred instruction in the classroom. The literature abounds with alternative pedagogies that promise to enhance engagement and improve student outcomes.

In this interactive presentation, participants will observe lessons based on alternative pedagogies. They are based on three core principles:

1. Active learning.
2. Anchoring abstract ideas on tangible constructs.
3. Using argumentation and assessments to promote understanding.

The ideas discussed in this presentation may inspire teachers to reflect on the structures of their science lessons to develop activities that support science learning for all their students, irrespective of their academic abilities. No matter their science journeys, students who have had positive experiences in their science classrooms will become science-literate citizens of the world.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary

5.9 Dark Matter Detection: From the Lab to the Classroom

Jackie Bondell, Swinburne University/University of Melbourne

In 2023, the Southern Hemisphere's first underground Dark Matter detector will start collecting data one kilometre underground in the Stawell Underground Physics Lab. The ARC Centre of Excellence for Dark Matter Particle Physics brings together experts from across Australia and internationally to unlock the secrets of dark matter and foster the science and engineering leaders of the future. The Centre for Dark Matter Particle Physics designed a longitudinal partner program in which schools have regular incursions and curriculum-aligned lessons related to the nature of science and the science of detecting the unseen.

In this hands-on session, we will discuss and trial a selection of curriculum-aligned activities to incorporate topics related to the detection of dark matter into secondary science lessons while overviewing the cutting-edge science taking place here in Australia.

Participants will take home lesson plans, activity links, and other resources to help them confidently utilise this content in their classrooms.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary

5.10 Ediacaran Fossils

Trevor Stephenson, Seymour College

Welcome to a story, 550 million years in the making. The Ediacaran fossils of Nilpena, in the Flinders Ranges, are the world's greatest record of the advent and evolution of early animal life on our planet. These fossils are amongst the most important sites in the world for the study of the Ediacaran period. We have developed a 2-3 week unit of work for the Middle School to support teaching of the Ediacaran fossils in schools. Today's workshop will preview this teaching resource.

Target Audience: junior secondary (7-10)

5.11 Practical Science - Achieving the best outcome

Jane Hosking, Lab Managers Association of South Australia (LMASA)

As a newly qualified, or 'early in your career' Teacher of Science, the thought of those first practical lessons can be quite daunting.

Practical science lessons are a necessary part of daily school life, but an aspect of the profession that is not covered in detail during Teacher Training. This presentation aims to provide information to assist you in negotiating a range of skills, such as risk assessment, managing practical equipment and classes, student engagement in the laboratory, and will also offer many hints and tips to help you achieve the best outcomes possible from these lessons.

Target Audience: junior secondary (7-10), lab officers

5.12 Teaching the language of Climate Change Science

Julie Hayes and Michael Cannavan, Primary English Teaching Association of Australia

In 2021, Julie Hayes, and colleague Bronwyn Parkin, wrote 'Teaching the Language of Climate Change Science'. Focusing from preschool to Year 8, they identified all descriptors in the Australian Curriculum: Science that provided opportunities to develop inquiry topics about climate change. The book consists of units of work for each of these topics, with an introductory chapter on the role of language in science, and a final chapter on how to use student knowledge about climate change science for advocacy. In this workshop, Julie Hayes introduces the book, followed by Melita and Michael describing how climate change topics were introduced in their classrooms.

Target Audience: primary (R-6), junior secondary (7-10)

5.13 Ensnaring Everyday Events: Identifying Authentic STEAM in Daily Activities

Alexandra Fowler, Woomera Area School

Children are exposed to science, technology, engineering, art and maths in every aspect of their life. Supporting students to see the STEAM they experience daily can help increase engagement and their passion in STEAM subjects. Examples like the recent extreme weather causing significant increases in insect life in the school yard are perfect for a STEAM learning. This session is based on using everyday occurrences to create STEAM based challenges, tasks and learning activities that build STEAM skills including creation, observation, problem solving, analysis and refinement. In this workshop you will explore different types of activities, learning outcomes and techniques for designing various challenges based everyday event.

Target Audience: primary (R-6)

5.14 Meeting your students where they are: adaptive teaching and learning for access and equity

Australian Academy of Science Education Team

Each student brings different life experiences and STEM understandings to our classrooms, and adapting our teaching in responsive and effective ways which meet learners' needs is a key part of a teacher's work.

Join us for an interactive Education Dialogue session to explore what could be designed, developed, and tested to address matters of equity in science and mathematics education in Australia.

In this session, we'll share insights from our landscape review of access and equity matters in Australian STEM education, and you'll have the opportunity to share your experiences, strategies, and insights with Academy team members and other participants.

This session will also explore the concept of science capital and provide evidence-based strategies for eliciting and building the science capital of all learners.

Target Audience: primary (R-6)

5.15D Teaching Science through the creation of interactive VR inquiries - DOUBLE SESSION PART 1

Rosanna Cotino and Dr Paul Unsworth, edgedVR

Digital learning technologies now play a key role in schooling and education. However, exactly where Virtual and Augmented Reality (XR) technologies fit within this rapidly changing schooling and education landscape has yet to be determined. Whilst use of virtual and augmented reality technologies in education are broadly apparent, there is scant evidence of studies that investigate XR's educational merit from within a design, creation and inquiry context - studies that have tracked and determined how teachers and their students benefit from the use XR as learning technologies, especially in STEAM projects and or Science Inquiry studies where teachers and students critically have communicated and shared knowledge through the creation of interactive assets within XR products for storytelling and inquiry.

Target Audience: senior secondary (10-12), tertiary

5.16D How to Develop Integrated Hands-on STEM Primary Programs - DOUBLE SESSION PART 1

Paula Taylor and Melissa Bissett, Academy of Future Skills

The Academy of Future Skills is the ACT Education Directorate's flagship STEM initiative that delivers high-impact STEM mentorship and customised programs to strengthen and support classroom teachers across the Directorate to deliver authentic and engaging STEM lessons. The workshop is centred around how to carefully select, plan and sequence integrated STEM units that are problem-based, effective and purposeful. We will explore and unpack several of our popular primary units that will cover a breadth of curriculum areas so that you work smarter and not harder in your planning and reporting.

Target Audience: primary (R-6)

SESSION 6 | 11.50AM - 12.50PM

6.1 Identifying risks in popular laboratory experiments

Phillip Crisp and Eva Crisp, RiskAssess

We will look at popular laboratory experiments which have a history of safety problems and, unfortunately, a history of injuries to both students and staff. While some incidents are unusual and unique, most have common factors which can be understood. The aim of this presentation is to help you spot the common factors of experiments that may cause injuries, so that you can implement control measures to avoid injuries in the future.

The substance involved in more serious injuries than any other is methylated spirits.

It may be either accidentally lit by an unguarded ignition source, or deliberately lit as part of an ill-advised experiment. Environmental factors need to be considered, especially when conducting experiments outdoors. Other high-risk materials include sodium hydroxide, sulfur, chlorine and bleach.

Risk assessments are required by law and help you to decide which control measures are appropriate and assist you to document the measures. RiskAssess offers a simple and rapid approach to the assessment of risks and provides school-appropriate advice about the potential hazards of chemicals, equipment and biologicals.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12), lab officers, tertiary

6.2 Using The Oliphant Science Awards to Teach Quality Science

Kathleen Best, Clarendon Primary School

This workshop will help participants to use the resources available through the Oliphant Science Awards to teach science in a meaningful way in classrooms. We will be using planning documents and going through how to implement the ideas behind the awards into whole school and classroom planning. This workshop will also go through how to use the rubrics available to assess projects across a range of subjects for the scientific content, allowing for greater differentiation in lesson design and integration. This workshop is useful if you are planning to participate in the Oliphant Science Awards or just want to use their resources in your school.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

6.3 Car safety: Collisions and crumple zones

Phillip Arthur, St Pius X College, Sydney

Car Safety: Collisions and Crumple Zones is an extended investigation for Year 11 Physics. It is designed to further develop and assess Working Scientifically Skills, and to develop concepts associated with force, acceleration, momentum and impulse.

In this workshop, participants will design, build and test prototype crumple zones for collision trolleys, which are used to model the behaviour of a car in a collision. The aim is to minimise the acceleration passengers would experience in a collision, while minimising the size and mass of the crumple zone.

Participants will:

- construct several prototype crumple zones
- crash test the prototype crumple zones using force sensors to capture force-time data for the crashes
- analyse the force-time data using Excel, in order to determine the best prototype.

Participants will be provided with the documentation used for the extended investigation, including the assessment rubric.

Target Audience: senior secondary (10-12)

6.4 Modelling STEM through Earth and Environmental Science

Kelly Sharrad, Geoscience Pathways Project

This workshop focuses on modelling STEM through Earth and Environmental Science. The world is currently facing a climate crisis and STEM careers are at the centre of the solution. SACE Earth and Environmental Science (EES) allows students to explore new sustainable solutions when using Earth's resources. It also increases their awareness of the interconnectedness of Earth through the four spheres; biosphere, hydrosphere, geosphere and atmosphere. These spheres are significantly impacted by human activity and require STEM to find solutions to ensure the balance on Earth is maintained. The external assessment for SACE EES is a long term field study which teaches students conceptual thinking and skills required in STEM careers tackling the climate crisis. GPP can provide all resources and support, for free, to help your school be part of the climate solution.

Target Audience: senior secondary (10-12)

6.5 Hands-on Chromatography

Sheryl Hoffmann & Fiona Brown, Concordia College

Chromatography is a useful technique that can be used in senior Chemistry, Biology and Junior Science. Come and try a variety of techniques, learn the basic theory and get additional practical examples for Paper Chromatography, Thin Layer Chromatography (TLC) and Column Chromatography. The focus will be on correct techniques and tips for getting the practicals to work well. The workshop would suit teachers & laboratory technicians.

Target Audience: junior secondary (7-10), senior secondary (10-12), lab officers

6.6 (Outer) Space in Your Curriculum: Building Science Inquiry skills with data from space

Alice Fairey, Hannah Vine Hall, Isabella McCulloch and Maddy Parks, Australian Space Discovery Centre

Science and Maths are best understood when applied, but it can be difficult to generate large and interesting data sets for analysis from student experiments alone. Students can struggle to engage with supplied data sets for Science Inquiry exercises, as even when they are based on practical work, they can feel too abstract.

Publicly-available tools for accessing space data can bridge this gap, providing an opportunity for students to extract relatively large data sets from intuitive visualisation tools. This emulates the experience of gathering observations in cases where a practical investigation is, simply, impractical.

In this workshop, participants will have the opportunity to work through some suggested activities to record, interpret, represent and draw conclusions from data extracted from visualisation tools, including the Sentinel Hub Earth Observation (EO) Browser, NASA's Solar Dynamics Observatory (SDO), and Saber Astronautics' Terrestrial and Astronomical Rapid Observation Toolkit (TAROT).

Target Audience: junior secondary (7-10), senior secondary (10-12)

6.7 Being Curious: Bridging Gaps Between Numeracy and Science

Dr Jeanne Young Kirby, Flinders University and Dr Alix Verdon, Australian Science and Mathematics School

In this workshop, we will involve participants in discussions about how they think about and structure their teaching of the application of numeracy skills when conducting science inquiry and analysing data. What are the cognitive challenges for the learners? What are the classroom challenges for the educators? What role does the affective domain (curiosity) of learners and educators play in improving the experience and outcomes for both?

Engaging our students in developing their skills and confidence in numeracy through Science traditionally occurs more through some disciplines of science, such as Physics, than others, such as Biology. In this workshop we use examples from Biology, demonstrating the transferability of these numeracy and data analysis skills across science disciplines. In the digital age these transferrable skills, and the confidence to apply them, are even more widely applicable, as big data collection and data analytics drive decision-making processes that impact every aspect of day-to-day life, and fake news and statistics are rife across news and social media platforms.

Conducting authentic science inquiry, now more than ever, requires students to take a quantitative approach. This places a high cognitive demand on students when apply numeracy skills to solve problems, make decisions and analyse data, and, at the same time, develop their understanding of scientific concepts. Participants will engage in science-based problem-solving activities, where they will be encouraged to consider their own affective response while exploring data and applying numeracy skills. We will ask participants to be mindful of the discomfort of not knowing the answer and take joy in being curious about what the data tells us. We will work with participants to build confidence in questioning techniques while they use the core numeracy basics and curiosity to bridge the gap between Numeracy and Science.

Target Audience: junior secondary (7-10), senior secondary (10-12)

6.8 Flippin' Booklets- Flipped Learning and Assessment

Toby Ward, Brighton Secondary School

Flipped Learning is a teaching strategy that gives teacher time back to students in order to improve their learning outcomes. In this session I'll go through what flipped learning is, how I use it in my class, the different technologies that can be used for flipping, strategies for flipping your class, how I have integrated the use of booklets to demonstrate learning, and how to flip feedback on assessment tasks. If you bring your laptop or device, I'll get you started on your first flip!

Target Audience: junior secondary (7-10), senior secondary (10-12)

6.9 Hands-on Science Activities for Lab Managers

Jacob Strickling, Tiny Science Lab

This will be an engaging and practical workshop where participants will have the opportunity to use a variety of equipment from Tiny Science Lab. The focus will be on Chemistry and Electricity equipment.

Target Audience: lab officers

6.10 Educational satellites - Assembling and using CubeSats in class

Edward Robinson, Robinson Aerospace Systems

Participants will assemble a CubeSat replica that is designed to look, function and assemble just like a real satellite. There will be up to 10 satellites available to assemble, so participants will assemble them on their own or in pairs depending on the final number.

Participants will have the opportunity to assemble the aluminium structure, install the solar panels and assemble the internal electronics to bring the satellite to life. From there, they can get data from it wirelessly and display the data on Robinson Aerospace's online software. Along the way, they will get a better understanding of Australia's space industry and the many incredible opportunities for today's students.

RASCube Educational Satellites are currently available to purchase on Robinson Aerospace's website. They are designed to teach students in years 8-10 about satellite technology, ultimately inspiring them to pursue careers in Australia's rapidly growing space industry.

Target Audience: junior secondary (7-10)

6.11 How to use iNaturalist to engage your students in nature and citizen science

Nicole Miller and Stephen Fricker, Ferox australis

With the growing popularity of citizen science and the evidence for the importance of engaging children with nature growing, you may be wondering about ways to get students outdoors and involved with citizen science. In this workshop, Stephen and Nicole from Ferox australis, a South Australian not-for-profit organisation that aims to increase public environmental education through the use of citizen science-related tools and initiatives, will share an introduction to the citizen science platform iNaturalist. iNaturalist is a free platform where you can record observations of plants and animals. To record an observation, snap some photos of species in your schoolyard or the local area, and iNaturalist will help to identify them using the inbuilt AI and suggestions from expert and other amateur users. Once identified, you can learn more about species, such as their distribution, seasonal trends in their abundance, and even other facts about their biology. Observations contribute to the Atlas of Living Australia and the Global Biodiversity Information Facility data repositories, where scientists can use the data for research and conservation purposes. iNaturalist is used in large BioBlitz events that you and your students could participate in or can be used anytime to learn about the plants and animals around you. You could even create your own school project to document local species or have your own BioBlitz. This workshop aims to introduce iNaturalist, give you a chance to try it out with guidance from Stephen and Nicole and inspire you to try citizen science with your students.

Target Audience: primary (R-6), junior secondary (7-10)

6.12 Teaching Chemistry through Minecraft

Kawajit Kaur, St Helens District High School Tasmania and Rosemary Anderson, Tasmanian Department for Education, Children and Young People - Teaching and Learning

Minecraft is an open-world game full of possibilities, where players can create and build, solve problems together, and explore amazing worlds. In this workshop, teachers will have the opportunity to introduce Chemistry through Minecraft without taking students to a science lab. This particularly benefits students whose schools have limited resources where the use of science labs is left to senior students.

Students will

- be introduced to chemistry concepts without the use of a science lab in an engaging way.
- will be inspired to explore the subject in a creative way using the new tools in the Chemistry Resource Pack (in Minecraft Education)
- will be able to conduct experiments within Minecraft that simulate real-world science.

For maximum benefit, participants will need to have pre-downloaded Minecraft Education onto their devices.

Target Audience: primary (R-6), junior secondary (7-10)

6.14 On the Shoulders of Giants. Linking innovation and S.H.E.

Sarah Finney, Stirling East Primary School

On the Shoulders of Giants.

Innovation is a tenuous and slippery concept, can be daunting, and is difficult to materialise from thin air.

But...that's not how Scientists actually work...

'On the Shoulders of Giants' is a workshop that will demonstrate how you can teach your students innovation is born from the scientific process.

Using simple tangible materials and examples from Stirling East Primary School, Sarah will lead an active workshop full of examples and take home resources that will assist your students to truly understand and become adept in the process of innovation.

Target Audience: primary (R-6)

6.15D Teaching Science through the creation of interactive VR inquiries - DOUBLE SESSION PART 2

Rosanna Cotino and Dr Paul Unsworth, edgedVR

Digital learning technologies now play a key role in schooling and education. However, exactly where Virtual and Augmented Reality (XR) technologies fit within this rapidly changing schooling and education landscape has yet to be determined. Whilst use of virtual and augmented reality technologies in education are broadly apparent, there is scant evidence of studies that investigate XR's educational merit from within a design, creation and inquiry context - studies that have tracked and determined how teachers and their students benefit from the use XR as learning technologies, especially in STEAM projects and or Science Inquiry studies where teachers and students critically have communicated and shared knowledge through the creation of interactive assets within XR products for storytelling and inquiry.

Target Audience: senior secondary (10-12), tertiary

6.16D How to Develop Integrated Hands-on STEM Primary Programs - DOUBLE SESSION PART 2

Paula Taylor and Melissa Bissett, Academy of Future Skills

The Academy of Future Skills is the ACT Education Directorate's flagship STEM initiative that delivers high-impact STEM mentorship and customised programs to strengthen and support classroom teachers across the Directorate to deliver authentic and engaging STEM lessons. The workshop is centred around how to carefully select, plan and sequence integrated STEM units that are problem-based, effective and purposeful. We will explore and unpack several of our popular primary units that will cover a breadth of curriculum areas so that you work smarter and not harder in your planning and reporting.

Target Audience: primary (R-6)

SESSION 7 | 2.10PM - 3.10PM

7.1 How to invent stuff without becoming the evil genius type: Innovating responsibly

Gemma Reid & Daizee Wiles, CSIRO

How do we harness the curiosity and blue sky thinking of our students, the next generation of STEM leaders? How can we ensure that future science and technologies are designed with socially responsible innovation principles top of mind?

Australia is looking to science and technology to solve its biggest challenges. New innovations and disruptive technologies are creating rapid and big change across all sectors. For better outcomes, these must be created with human endeavour at the core and ensure innovator diversity is championed - and this includes input from young people. They bring their own aspirations and ideas to science and technology, along with a spark of creativity and fun.

Emulating real-world practice by scientist and design thinkers at CSIRO, STEM Together offers teaching and learning opportunities in Responsible Innovation (RI). Join the STEM Together team for a discussion on equipping students to responsibly innovate for the future by considering the implications for our environment and society.

During this presentation teachers will learn the benefits of applying this practice in the classroom to enhance science inquiry and design technology skills. It will include reflection on how RI has been implemented in schools, and how students have responded to using design thinking practices with their peers. Short activities will provide teachers an understanding of how this can be used creatively in the classroom and in a multimodal way to allow for greater student engagement. Following this introduction to RI in the classroom, participants will have access to further professional learning and resources.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

7.2 Black Holes and Gravitational Waves: Contemporary Topics, Innovative Classroom Ideas

Jackie Bondell, Swinburne University / University of Melbourne

In 2023, the LIGO (Laser Interferometer Gravitational-Wave Observatory) will start its fourth observing run (O4). This will mark the most sensitive search of the cosmos for gravitational wave signals to allow scientists to learn about the most extreme matter in the universe.

In this hands-on session, we will review these latest discoveries that have opened new windows into understanding the universe. Then we will introduce teachers to multiple activities that can be used in the classroom to introduce secondary science students to some of the major concepts related to detecting and analysing gravitational waves.

Teachers will have the opportunity to participate in these activities and will receive materials with curriculum links to incorporate these activities in their own classrooms.

Target Audience: senior secondary (10-12), tertiary

7.3 A Healthy Land - Measuring the environment with Vernier dataloggers

Stuart Lewis, Scientrific Pty Ltd

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 chlorophyll in plants
- Investigating plant photosynthesis
- Investigating respiration
- Abiotic conditions
- Water analysis

Target Audience: junior secondary (7-10), senior secondary (10-12), lab officers

7.4 Chlorophyll Determination via Spectrophotometry

Belinda Stumer, Craigslea State High School

Plant leaf tissue contains pigments that are able to absorb light energy and funnel that energy into the plant photosystems to produce energy rich compounds ATP and glucose. Pigments absorb visible light of specific wavelengths and reflect others. Spectrophotometers can measure “absorbance” through a liquid sample at various visible light wavelengths and can be used directly to determine the absorption spectrum of plant pigments. In addition, by applying the Beer-Lambert law and published extinction coefficients for chlorophyll, absorbance readings can be used for determination of total chlorophyll concentrations and assessment of proportion of chlorophyll types (Arnon, 1949).

In the session, chlorophyll pigments will be extracted from spinach leaves using 80% acetone and then experimentally analysed at various wavelengths using a visible light spectrophotometer. Absorbance measurements will be graphed and used to demonstrate the full absorption spectrum for chlorophyll. A chlorophyll determination will also be conducted for the spinach leaf samples. Specific formula will be explained and participants will be assisted to perform calculations.

The practical relevance for junior science curriculum areas, Biology and Chemistry investigations will be discussed.

Target Audience: junior secondary (7-10), senior secondary (10-12), lab officers

7.5 Our place in space: connecting science to local communities and inclusive pedagogies

Angeline Buckler, Brendan Clewes and Brett Summers, Aldinga Payinthe College

Are you looking for ways to connect learning to local communities? At Aldinga Payinthe College we belong, we inspire and we connect. We look for ways to put connections with local communities at the forefront of learning. Payinthe is a Kurna word that means to seek, look for, examine, and to be thinking. Join us as we seek to unpack the ways that we have made connections with local communities and environments - through our community open nights and curriculum design - and consider how you might apply these at your own sites. Come and try first hand some of the pedagogical tools that we utilise in our classrooms. In this session we will go over a range of tools, ideas, and practices that help us to better situate learning within our local place and space.

Target Audience: junior secondary (7-10), senior secondary (10-12)

7.6 UniSA STEM Innovation Experience (STEMIE)

Anita Trenwith, University of South Australia

University of South Australia presents the STEM Innovation Experience (STEMIE), a program designed to increase Science, Technology, Engineering and Mathematics (STEM) engagement in secondary schools and enhance awareness of STEM in the wider community. Students complete STEM challenges around a central theme at school and representatives from each school showcase their learning.

Winning schools from regions across South Australia, Queensland, New South Wales, Victoria and Western Australia will progress to the STEMIE Finals to compete in unseen STEM challenges against the clock. The finals are held at The University of South Australia in November each year.

The program is supported by UniSA with teacher professional development, student workshops, zoom meetings and online resources. Come along and see how you can get your school involved.

Target Audience: junior secondary (7-10), senior secondary (10-12)

7.7 Writing Online Tests with AssessPrep

John Wright, Raquel Hogben and Patrick Swanson, St Peter's College

With some senior science subjects moving to online examinations, it is becoming increasingly important to prepare our students for online examinations. Over the course of the last two years, we have been using AssessPrep to provide online topic tests for Stage 1 and Stage 2 SACE Biology. During this session, we will show delegates how to use AssessPrep to write and mark tests, as well as demonstrate what students see when they sit an online test.

Target Audience: junior secondary (7-10), senior secondary (10-12)

7.8 Space Education in Australia - Building Capacity

Dr Sarah J Baker, Hamilton Secondary College - Space School

An intensive effort across many sectors is needed to further develop Space Education in Australia, equipping future generations with the passion, knowledge and skills to be innovative, entrepreneurial and globally competitive in the space sector workforce.

There are multiple educational approaches that support the development of a strong pipeline of highly skilled students, equipped to work in the space sector. This talk focuses on three essential approaches: raising student awareness of the space sector; intellectually engaging students in a rigorous space education curriculum; building the capacity of teachers.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary

7.9 The data doesn't lie - or does it?

Ingo Koeper and Hayden Tronnolone, Flinders University

The data never lies, right? Not necessarily!

We are exposed to more data than ever before, but different ways to present data can and is used both to find new truths and to mislead us. This is especially true in science, where the same data on phenomena such as climate change and vaccine efficacy can be used to draw different, often opposing conclusions. It is thus important that students understand the importance to critically assess data. They should learn not only how to use data but also how it could be used against them. At the same time, this is complicated by mathematical anxiety, which often significantly impedes student engagement with data, data manipulation and data representation. Making it a fun activity, should reduce the hurdle to engagement and allow students to gain an appreciation of the importance of the subject.

In this workshop, we will review common ways that data is used to distort the truth, highlighting real-world examples. We will convince you of theories, you would not think being possible. Participants will have the chance to explore these ideas on real data and try to tell a lie, while others try to spot the trick. This activity can be used across the senior science curriculum to explore how scientific data is used and misused.

Target Audience: junior secondary (7-10), senior secondary (10-12), tertiary

7.10 Kids Teaching Kids: Peer learning to drive local action on environmental issues

Michelle Tripp, Earthwatch Australia

“Students teaching students”, an exciting concept, one that happens incidentally all the time, but are we making the most of this idea? Several years ago we began experimenting with this concept. The impact on students was so profound we decided to pursue the approach. Since then, Kids Teaching Kids has continued to grow becoming a national program that has reached over 154,000 students.

The Kids Teaching Kids Program promotes positive wellbeing and helps build resilience in young people. It raises awareness and drives action on local and global environmental issues, bringing communities together to solve common challenges and help the next generation of leaders who will take collective responsibility for our future.

Based on four key change-making steps, the Kids Teaching Kids program increase environmental literacy, create connections within communities, drives on-ground environmental projects and encourages engagement in STEM through student driven. Living the KTK pedagogy, in this workshop you will learn how to engage your students in the program and drive environmental leadership and empowerment in an experiential student led program.

Target Audience: primary (R-6), junior secondary (7-10)

7.11 How to avoid injury and have a lot of fun with Primary STEM activities!

Eva Crisp and Phillip Crisp, RiskAssess

Some primary school teachers find STEM activities daunting, due to a lack of familiarity with chemicals and a fear of injuries. Recent hospitalisation of 11 students at a Sydney primary school after an ‘experiment-gone-wrong’ have added to concerns. We believe that experiments should be both interesting and safe. Importantly, young minds should have their curiosity maintained and their skills of observation developed, so that they are excited to continue with STEM in later years. In this talk, we will provide fun examples of safe chemical experiments.

Primary RiskAssess allows you to easily find out about the potential hazards of different chemicals, equipment and biologicals, plus you can quickly carry out risk assessments of STEM activities, as required by law. Primary RiskAssess even includes advice regarding allergies. We will show you how Primary RiskAssess can be used during the design of interesting STEM activities, so that potential hazards can be avoided and the students remain safe.

Target Audience: primary (R-6), lab officers

7.12 When the Pedagogy of Play meets Ambitious Science Teaching

Mary Rafter, The University of Queensland

We tend to think of ‘play’ as the domain of the early years, but the reality is that play is one of the more effective ways we learn to take risks and navigate our world. How can we continue to use play in the primary science space? Ambitious Science Teaching provides a framework that validates play and incorporates growing knowledge meaningfully.

This workshop will explore the role of play in revealing the science we want students to explore, explain and elaborate within a context. This is about serious science and ways to engage all students and help them build understanding.

Target Audience: primary (R-6)

7.13 SHARE-A-THON

An informal setting for multiple presenters to share innovative teaching ideas. Each presenter will share a strategy or tool during a 10-minute presentation and delegates will rotate around the room.

Science Energisers

Dina Matheson, Woodville High School

Brain break, brain teaser... Here's a fun way to get your students engaged in scientific thinking and problem solving. Make it a competition for added fun and drama!

During this Share-a-thon Session, participants will be invited to have a go at some short science brain break activities, suitable for all ages. These are a great way to break up a lesson, or to use as a warm-up at the beginning of a lesson. And the best thing is, they don't require a lot of prep. Can be done with easily accessible materials. No Risk Assess required!

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12), lab officers, tertiary

Change the World with Chemical Engineering

Michelle McLeod & Dr Diana Tran, RiAUS & The University of Adelaide

Join this session to explore the diversity of Chemical Engineering. The Royal Institution of Australia (RiAus) and the School of Chemical Engineering at The University of Adelaide are working in partnership to showcase the ground-breaking innovations taking place in this exciting STEM field. Come along to discover how current and emerging research in chemical engineering is saving and changing our world. In this Share-a-thon Session you will have the chance to explore outreach activities, learn about curriculum connected resources, collect career exploration materials, and get hands-on. Topics covered include: food and beverage innovations; cutting edge health and medical approaches; advanced manufacturing; sustainability and urban mining; alternate energy systems; and off-world resource processing. Inspire your students to change their world.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12), lab officers

Harnessing the Power of Technology in the Science Classroom

Kelly Hollis, Education Perfect

The teaching of Science requires the effective delivery of curriculum-aligned content alongside the use of solid pedagogical approaches. Since the introduction of technology into education, teachers have been looking for ways to effectively integrate it into their teaching practices. The effective integration of technology can be a powerful strategy to ensure highly engaging and interactive face-to-face learning environments occur.

Blended learning and flipped learning are two pedagogical approaches that employ quite similar features— including their adaptability to online learning contexts. Often teachers use the two approaches interchangeably, depending on their students and the concepts being taught. Although the two approaches are slightly different in their implementation, the benefits for students are quite similar.

As Science teaching and learning requires the cohesive blend of subject matter from multiple disciplines alongside engaging and active classroom experiences, the exploration of both pedagogical approaches can be extremely useful for educators.

Understanding how to harness the power of technology is the first step towards creating active and engaging Science classrooms for your students. In this session we will explore a number of technology tools including content creation tools, formative assessment tools and a range of AI tools that can be used for student projects.

Target Audience: primary (R-6), junior secondary (7-10), senior secondary (10-12)

SAT Electromagnetism teaching hacks

Phillip Arthur, St Pius X College, Sydney

Several teaching 'hacks' that provide concrete introductions to abstract concepts, including visualising interactions with magnetic fields, and experiencing the effect of laminations on magnetic braking.

Target Audience: senior secondary (10-12)

Health & Safety in the Lab

Vicki Jordan, Varsity College

Quick guide to health and safety in the laboratory, chemical management, storage of chemicals in the prep room, risk assessments when ordering practical work and avoiding some risks to students.

Target Audience: lab officers

Favourite pracs

Wendy Shearer, Mango Hill State Secondary College

A selection of teachers' favourite pracs that, as a technician, I have introduced to schools.

1. Save Freddo (Heat conduction/insulation)

Using readily available materials from the prep room, make a shield to protect Freddo from the elements (aka a hair dryer trying to melt him within seven minutes)

2. Rainbow fizz (pH)

This makes a universal indicator column in a burette or can be modified as a class experiment for test tubes.

3. Marshmallow Lander (collision)

With the provision of simple materials, students are to design a lander to safely land marshmallows with out them falling out of their lander (cup).

This can be done as a competition to find the design that withstands the greatest height, or it needs to meet a minimum height. This will not be a practical session but I will have examples and notes will be available via email.

Target Audience: junior secondary (7-10), lab officers

Soda water - Particle Theory and Gas Pressure

Jane Hosking, LMASA

An exercise in investigation of the ordinary! Bottles of Soda water at room temperature and when refrigerated can be used to demonstrate the particle theory and gas pressure to students, and get them thinking scientifically about why things happen as they do in everyday situations.

Target Audience: junior secondary (7-10)

Creating a successful primary science learning community

Miriam Doull, Mitcham Primary School

With hundreds of students to engage every week, creating a successful learning community in the primary science classroom has unique challenges. There isn't room for 300 models in progress, or 300 posters on the walls. Displaying model texts for Bump it up Walls, co-created Word Walls, and topic specific student-led Wonder Walls can be too busy and confusing. As well, students can feel less connected to the teacher, room and learning when they visit once a week not every day. Conversely, students can arrive extra excited and expecting high entertainment and fun from science class – every single lesson! I will share some of the strategies that I use to engage students and increase student agency in the Primary Science Classroom, thereby improving student learning outcomes.

Target Audience: primary (R-6), junior secondary (7-10)

Exploring Whiteboard

Pete Beveridge, Pennington School R-6

Using the Microsoft Whiteboard application, we will explore how you can create a space that enables you to have all your lesson resources in one place, and allows you to get on with the thing you are greatest at; TEACHING!

A space to embed videos, create notes, record student ideas, draw diagrams and much more is now right at your fingertips!

Target Audience: primary (R-6), junior secondary (7-10)

Future You - Science as a Human Endeavour embedded into teaching

Hilary Schubert-Jones, Office of the Women in STEM Ambassador

Research has found that gender stereotypes, biases and poor understanding of how STEM subjects relate to exciting and rewarding STEM careers are barriers to girls' participation in STEM. The free-to-access 'Future You' program aims to address these issues to improve future education and opportunities for underrepresented people in STEM and to strengthen the STEM pipeline so Australia's future workforce can meet the challenges of the future. Pathfinders is a national program that has been designed to show children the breadth and scope of STEM careers, and the diversity of people who can work in those careers. We will show you how to link the Science National Curriculum to teaching resources to weave Science as a Human Endeavour content into your lessons seamlessly.

Target Audience: primary (R-6), junior secondary (7-10)

Primary Science & Technology Integration in Nature Space Education

Colleen O'Rourke / Cavan Newble / Lyndell Gay, The Hills Christian Community School

Support teachers' abilities to integrate technology in instruction across the curriculum with a strong cross-curricular focus on biological science and digital technologies in Nature Space Education.

Outdoor Learning (Biological Sciences) Innovative Curriculum Design - Connecting Digital Technologies topics with Biological Sciences across the curriculum (eg Digital Systems & Earth Systems, coding and biomimicry, data transfer in nature vs data transfer in digital systems, GPS navigational tools vs bird navigation systems).

PBL Projects (Assessment) - Students integrate biological sciences concepts and sustainability solutions within a computational environment through project-based learning, allowing them to exercise science and engineering practices in an authentic research experience.

Target Audience: primary (R-6)





**Public education
is for every child
and young person
in South Australia.**



Government of South Australia
Department for Education