STEM Conference

2 December 2022
UniSA, Magill Campus

Modelling STEM

Program

Sponsored by:

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Timetable

8.00am	Registration | Tea & Coffee	Auditorium
8.40am - 9.00am	Welcome & Housekeeping	H Building
9.00am - 10.00am	Keynote Presentation	H Building
10.10am - 10.35am	Morning Tea	Auditorium
10.40am - 11.40am	Workshop Session 1	H Building
11.45am - 12.45pm	Workshop Session 2	H Building
12.45pm - 1.45pm	Lunch	Auditorium
1.50pm - 2.50pm	Workshop Session 3	H Building
2.55pm - 3.55pm	Workshop Session 4	H Building
4.00pm - 5.00pm	Happy Hour	Auditorium

Keynote Presentation

Empowering Learners for the Age of AI

The complexity and uncertainty of the future is growing daily. Tremendous advances in technology and engineering reveal humanity at its pinnacle. Unfortunately, global connectivity has also produced a conflicted society, where even basic scientific truths can be diminished or outright ignored. Simultaneously, the past decade has seen the rise of artificial intelligence, with large swaths of what was thought to be uniquely human - playing Chess or Go, image detection, writing - being progressively taken over by AI. How do we prepare learners to exist in this world of stunning advancements, polluted information ecologies, and growing threats to our future? This presentation will explore foundational ways of being in order flourish in the AI age, focusing on required content knowledge, affective and emotional states, and metacognitive strategies required by all learners and citizens.

Environmental Impact

Catering

The caterers will provide bamboo compostable plates and cutlery for the event to reduce the amount of waste being sent to landfill. Please be sure to place these items in the green/organic bins provided around the venue.

Printing

All conference information will be available online, including the program. Delegates will have wi-fi access at the conference so please bring along a device to access these details.

We have also encouraged presenters to consider electronic distribution of workshop resources to reduce the amount of printing and paper used at the conference.

The conference evaluation will be sent electronically after the conference and a PDF copy of your certificate will be sent via email the week following the conference.

Electronic 'satchel inserts'

In line with sustainable practices, SASTA & MASA aim to reduce the amount of paper distributed at conferences and will not be providing satchels this year. An email will be sent directly to all delegates that links to valuable resources from the conference.

Professor George Siemens

Professor and Director: Centre for Change and Complexity in Learning

George Siemens researches how human and artificial cognition intersect in knowledge processes. He is Professor at University of Texas, Arlington and co-leads the Center for Change and Complexity in Learning (C3L) at University of South Australia. He has delivered keynote addresses in more than 35 countries on the influence of technology and media on education, organizations, and society. His work has been profiled in provincial, national, and international newspapers (including NY Times), radio, and television. He has served as PI or Co-PI on grants funded by NSF, SSHRC (Canada), OLT (Australia), Intel, Boeing, Bill & Melinda Gates Foundation, and the Soros Foundation. He has received numerous awards, including honorary doctorates from Universidad de San Martín de Porres and Fraser Valley University for his pioneering work in learning, technology, and networks. He holds an honorary professorship with University of Edinburgh and appointments with the National Institute of Education in Singapore, and the Central China Normal University in Wuhan.

Workshop Sessions 1 & 2

10.40am - 11.40am

Session	Title	Presenter/s	Learning Area(s)
1.01	**Connecting Disciplines, Reflection and Earthquakes - Interdisciplinary STEM-Based Project**	*Oliwia Derda & Natasha Williams, St Columba College*	science (years 6-9)
1.02	**STEM-M=#000000**	*Neil Davis, MASA*	mathematics (years 6-11), science (years 6-11)
1.03	**Achievable, Meaningful and Impactful Assessment for Learning**	*Danielle Lockwood, Westminster School*	science (years 6-11)
1.04	**Closing the VOCAB in science**	*Katrina Elliott, Department for Education*	science (years 6-11)
1.05	**Analysing sound using student laptops**	*Paul Gavini, Modbury High School*	science (years 10-11)
1.06	**Do your own research**	*Ingo Koeper, Flinders University*	science (years 6-11)
1.07	**Building successful and engaged junior secondary Mathematics learners**	*Anna Beinke, Thomas More College & Ashley Evans, Edrolo*	mathematics (years 6-9)
1.08	**Ishikawa Cause & Effect Workshop**	*Teresa Janowski, Stem Fasttrack*	design & technologies (years 6-11), digital technologies (years 6-11), mathematics (years 6-11), science (years 6-11)
1.09	**Connecting Sustainability to Student's Lives Across the Curriculum**	*John Davison, Education Perfect*	science (years 6-11)

11.45am - 12.45pm

2.01	**Ediacaran Fossils**	*Trevor Stephenson, Seymour College & Sonya Arnold, Department for Education*	science (years 6-9)
2.02	**Mathematical Modelling of Penguin Behaviour**	*Helen Booth, MASA*	mathematics (years 6-11)
2.03	**Modelling STEM through Earth and Environmental Science**	*Kelly Sharrad, Geoscience Pathways Project*	science (years 10-11)
2.04	**Engaging Students Through Real Astronomical Data**	*Robert Hollow, CSIRO*	digital technologies (years 10-11), science (years 6-11)
2.05	**Serious games to teach science concepts**	*Campbell Harvey & Alix Verdon, ASMS*	science (years 6-11)
2.06	**Writing Maths Tests Years 7-10**	*John Absolon, Trial Exams*	mathematics (years 6-11)
2.07	**From Content To Connections: Modelling Intentional Curiosity In Citizen Science**	*James Tilly, Ocean Literacy Support Inc.*	design & technologies (years 6-11), digital technologies (years 6-11), mathematics (years 6-11), science (years 6-11)
2.08	**Modelling: a bridge to integrated STEM**	*Michelle McLeod, The University of Adelaide (STEM Teacher in Residence)*	design & technologies (years 6-11), digital technologies (years 6-11), mathematics (years 6-11), science (years 6-11)

Workshop Sessions 3 & 4

1.50pm - 2.50pm

Session	Title	Presenter/s	Learning Area(s)
3.01	**How can maths take you to space?**	*Jules Potiki, ASMS*	mathematics (years 6-11)
3.02	**Numeracy Intervention**	*Stefania Pulford & Mike Jones, Thebarton Senior College*	mathematics (years 6-11)
3.03	**Modelling STEM: How to equip students with skills for jobs with a future.**	*Claire Hughes, RiAus*	design & technologies (years 6-9), science (years 6-9)
3.04	**Arduino programming - Beginners**	*Paul Gavini, Modbury High School*	design & technologies (years 6-11), digital technologies (years 6-11), science (years 6-11)
3.05	**Could data save Humpty? A new approach to the classic egg drop.**	*Stuart Lewis, Scientrific*	design & technologies (years 6-11), digital technologies (years 6-11), science (years 6-11)
3.06	**Body-based learning in STEM education**	*Jennifer Chalmers, University of South Australia*	mathematics (years 6-11), science (years 6-11)
3.07	**Authentic Investigations using Modelling**	*Dr Alix Verdon & Dr Matthew Verdon, ASMS*	mathematics (yr 6-11), science (years 6-11)
3.08	**Student collected data helping scientists better understand local, regional and global environments**	*Bill Flynn, CSIRO Education and Outreach*	mathematics (yr 6-9) ,digital technologies (years 6-9), science (years 6-11)

2.55pm - 3.55pm

4.01	**Engineering a Monster?**	*Tisha Beasley & Kyran Zippel, ASMS*	science (years 6-11)
4.02	**Modelling using First Nations Games**	*Rebecca Garrett, Trinity College & Desiree Gilbert, AISSA*	mathematics (years 6-11)
4.03	**Differentiation of Tasks in 7-10 Australian Curriculum Science**	*Jason Greenslade, Westminster School*	science (years 6-11)
4.04	**Ediacara as a resource in Secondary Education**	*Tory Botha, University of Adelaide*	mathematics (years 6-11), science (years 6-11)
4.05	**2+ ways of authentically assessing mathematics**	*Dr Matthew Verdon, ASMS*	mathematics (years 6-11), science (years 10-11)
4.06	**STEM approaches using Data Loggers**	*Stuart Lewis, Scientrific*	design & technologies (years 6-11), digital technologies (years 6-11), science (years 6-11)
4.07	**Digital technologies in science and maths classrooms**	*Jennifer Chalmers, University of South Australia*	mathematics (years 6-11),science (years 6-11)
4.08	**Putting the T and the E in STEM**	*Alistair Knight, Thomas More College*	design & technologies (years 6-11), digital technologies (years 6-11), mathematics (years 6-11), science (years 6-11)

Workshops

Session 1

10.40am - 11.40am

1.01 Connecting Disciplines, Reflection and Earthquakes - Interdisciplinary STEM-Based Project

Oliwia Derda & Natasha Williams, St Columba College

Disciplines - There exists a significant overlap between the Science and Humanities curricula around plate tectonics, landforms and natural disasters. To remove the content repetition and gain a deeper understanding, Science and Humanities have partnered to develop an interdisciplinary STEM-based project around the topic of natural disasters. The project worked to develop student engagement, reduce cognitive load and promote team teaching approaches.

Reflection - The project worked to promote students to actively reflect on their approaches. Learning is engaged when students understand their thinking processes and can self-direct their learning and problem-solving.

Earthquakes - Students were placed in a challenging, open-ended environment to explore an authentic problem around earthquakes and natural disasters. Through an experiential and inquiry-based learning environment, students created an earthquake-resistant building fit for purpose and the landscape of their chosen location.

Target audience: science (years 6-9)

1.02 STEM-M=#000000

Neil Davis, MASA

Without mathematics there is no STEM. Some teachers have been heard to say that mathematics is not essential to teaching science. We dispel the absolute darkness of such thinking via hands on and other activities to demonstrate the primacy of mathematics in Science, in technology and in Engineering.

Target audience: mathematics (years 6-11), science (years 6-11)

1.03 Achievable, Meaningful and Impactful Assessment for Learning

Danielle Lockwood, Westminster School

Your first years of teaching will be a whirlwind of trying to get things right, you will, or already do feel that you are being run off your feet with planning and marking. This session will provide you with a variety of ideas for assessment for learning that will take minimal time and effort, but have maximum outcomes for you and your students.

I will show you ways to use websites, the Microsoft Suite, and student work to inform future teaching without eating into your planning time, marking time, or personal time.

Target audience: science (years 6-11)

1.04 Closing the VOCAB in science

Katrina Elliott, Department for Education

“The limits of my language mean the limits of my world” Wittgenstien

How far is the vocabulary gap an issue in your classroom?

What is already working in your classroom?

In this workshop we will look at a couple of Alex Quigley’s 7 steps in closing the vocabulary gap.

Step 2 Teach academic vocabulary explicitly and clearly, with coherent planning throughout the science curriculum.

Step 6 Foster ‘word consciousness’ in our students (e.g. sharing the etymology and morphology of words)

We will look at some strategies to further enhance teaching and learning of science to address the vocabulary gap and some literacy techniques to improve students’ reading and writing in science.

Target audience: science (years 6-11)

1.05 Analysing sound using student laptops

Paul Gavini, Modbury High School

This live session will go through the inexpensive requirements to use student owned laptops to modernise the analysis of sound wave structure and harmonics to measure the speed of sound through air columns and vibrating wires with high precision. Ideally suited as a yr 10 or 11 STEM investigative practical to replace old fasion techniques.

Target audience: science (years 10-11)

1.06 Do your own research

Ingo Koeper, Flinders University

"Do your own research" is a very common phrase that you find especially across all forms of social media. People are encouraged not to believe everything they read, but to "do their own research".

But what does this really mean?

How do you do research?

What do you need to do research?

How can you be sure, some research is 'true', or 'better' than the other?

This workshop will explore, how research, especially in science is typically conducted. We will look at different approaches towards research, limitations to research, as well as criteria to differentiate between trustworthy and questionable research.

The session will be hands-on and should be easily transferrable into a classroom.

Target audience: science (years 6-11)

CANCELLED

1.07 Building successful and engaged junior secondary Mathematics learners

Anna Beinke, Thomas More College & Ashley Evans, Edrolo

Join Anna Beinke, Leader of Learning - Mathematics, at Thomas More College, as she shares how she uses misconceptions and explicit teaching to foster engagement and a love of Mathematics within the junior secondary Mathematics program at the College.

Drawing on insights from the 'Thinking Classroom', and using the new Edrolo Year 7 Maths resource, Anna works with students to build conceptual foundations, scaffold learning and get students engaged and achieving. Anna will walk through a sample unit, demonstrating the achievement strategies and activities that are the basis for each lesson. Anna will also share examples of cross-curriculum integration, using models to support learning, and ideas for differentiation. Anna will be assisted in this session by Ashley Evans from Edrolo, who was a deputy principal and teacher for many years before joining Edrolo.

Target audience: mathematics (years 6-9)

1.08 Ishikawa Cause & Effect Workshop

Teresa Janowski, Stem Fasttrack

Learn how to use the ISHIKAWA method for problem solving. In a hands on workshop experience how to problems solve as a student and walk away with resources and experience on how to run your own workshop.

Target audience: design & technologies (years 6-11), digital technologies (years 6-11), mathematics (years 6-11), science (years 6-11)

1.09 Connecting Sustainability to Student's Lives Across the Curriculum

John Davison, Education Perfect

Environmental pressures and sustainability are global issues but effective and engaging, authentic learning in the classroom needs to be linked to local issues relevant to student's lives. In addition, these topics should be supported across multiple subjects in order for students to grasp the importance. Digital learning platforms, such as Education Perfect, have a huge role to play in sustainability education from delivering content, creating community and capturing the student voice, but they need to be able to make links from global to local and across the curriculum while allowing students choice and agency in delivering their response to an issue. Join us to see how Education Perfect's Sustainable Oceans cross-curricular unit can be used as an example to engage and challenge students and increase their awareness and understanding of these important topics.

Target audience: science (years 6-11)

Session 2

11.45am - 12.45pm

2.01 Ediacaran Fossils

Trevor Stephenson, Seymour College & Sonya Arnold, Department for Education

Welcome to a scientific expedition like no other – over 550 million years in the making. Long before the deadly dinosaurs, luscious land plants and feisty fish – to a time when the only life on Earth were soft bodied creatures living on the seabed. Welcome to the time of Ediacaran.

Today we will present a teaching resource which will transport you and your students back to when our mighty Flinders Ranges were submerged under sea water. Join us on a journey back to the very dawn of life itself.

Target audience: science (years 6-9)

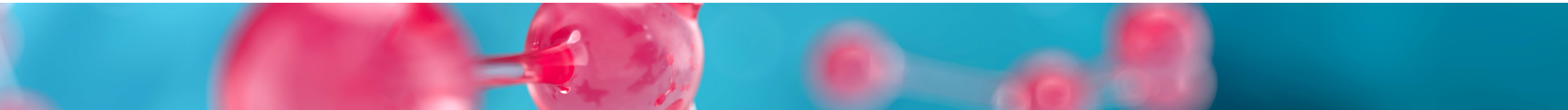
2.02 Mathematical Modelling of Penguin Behaviour

Helen Booth, MASA

Can mathematics help us to explain why it is advantageous for Emperor penguins to huddle? In the midst of winter, when temperatures can drop below - 40 degrees Celsius, Emperor penguins raise their young. One of the behaviours they exhibit that enables them to be successful is huddling together. Why and how does this relate to issues we face here in Australia? This session investigates surface area to volume ratio.

Can we show mathematically the advantage of huddling together?

Target audience: mathematics (years 6-11)



2.03 Modelling STEM through Earth and Environmental Science

Kelly Sharrad, Geoscience Pathways Project

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.

Target audience: science (years 10-11)

2.04 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 and examined. The possibilities for open-ended student investigations and citizen science are discussed. Upcoming projects and data challenges are highlighted.

Target audience: digital technologies (years 10-11), science (years 6-11)

2.05 Serious games to teach science concepts

Campbell Harvey and Alix Verdon., ASMS

How can you use games to model and simulate real science concepts? See how it can be done by playing a serious game about sustainability, used in ASMS's Sustainable Futures course that can apply to middle school science. Playing games to teach complex concepts can increase participation, engagement, make the abstract and complex more understandable, and make real world links for relevant science teaching. Get ready for a session of serious game play!

Target audience: science (years 6-11)

2.06 Writing Maths Tests Years 7-10

John Absolon, Trial Exams

Writing new and original maths questions for tests can be time consuming. The questions need to be difficult enough to meet ACARA and SACE expectations, but not so difficult that it disadvantages your students. This is just one of the many factors that needs to be taken into consideration. Learn what it takes to become a competent question writer in this session. The focus will be on ACARA maths years 7-10.

Target audience: mathematics (years 6-11)

2.07 From Content To Connections: Modelling Intentional Curiosity In Citizen Science

James Tilly, Ocean Literacy Support Inc.

'The more complex the world becomes, the more creative we need to be to meet its challenges' (Sir Ken Robinson 2011).

Through its multidisciplinary approach, STEAM Learning has the potential to ignite young people's interest and engagement with authentic, relevant, and deep learning experiences. But in an age of 'digital natives' who are rarely more than a few clicks away from answers, how can we help them to reclaim the art of asking great questions?

'Intentional Curiosity' - the art and science of inquiry through observation, questioning, and illustration (Laws 2013), has the potential to unlock learners' interest and connection with the natural world.

In this workshop we will explore how intentional curiosity and 'focused awareness' can be harnessed to support learners' Ocean Literacy and other 21st Century Fluencies.

Target audience: design & technologies (years 6-11), digital technologies (years 6-11), mathematics (years 6-11), science (years 6-11)

2.08 Modelling: a bridge to integrated STEM

Michelle McLeod, The University of Adelaide (STEM Teacher in Residence)

Models and modelling are central to each of the STEM disciplines. Come along to connect your classroom teaching with the STEM outreach opportunities facilitated by the University of Adelaide's Faculty of Sciences, Engineering and Technology. Explore how these activities and resources: model emerging STEM applications; integrate models within design and build challenges; and conceptualise links between research and curriculum.

Join this session to review available resources, suggest new ideas, explore research examples, network with academics, and trial activities.

Showcased resources include curriculum connected teaching and learning materials, workshop examples, and equipment available for loan.

Target audience: design & technologies (years 6-11), digital technologies (years 6-11), mathematics (years 6-11), science (years 6-11)

Session 3
1.50pm - 2.50pm

3.01 How can maths take you to space?

Jules Potiki, ASMS

Providing authentic mathematics connection to the real world is vital to develop rich understandings of mathematical applications and capabilities to solve 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.

Join us to see how students can use high school mathematics to determine the size of the Earth, the relative distance of the Moon and Sun, the distance from Earth to the Sun, the distance to nearby and faraway stars, and more, in this interdisciplinary STEM unit.

This workshop will enable participants to experience our 'Trigonometry challenges' assessment task of the Earth and Cosmos Module at ASMS for year 10 learners.

Target audience: mathematics (years 6-11)

3.02 Numeracy Intervention

Stefania Pulford & Mike Jones, Thebarton Senior College

Multiplicative thinking has been identified as one of the most important and also most difficult mathematical concepts for learners to develop. The numeracy team at Thebarton Senior College have found that students in the senior years often have gaps in their knowledge of multiplicative thinking, making the learning required, much more difficult. To assist students in their numeracy learning, a school wide numeracy program has been implemented using Scaffolding Numeracy in the Middle Years (SNMY), in our senior classes.

In this workshop, Mike Jones and Stefania Pulford will discuss the journey TSC has undertaken in implementing this program. They will also gives attendees an opportunity to practice some of the activities used in this intervention.

Target audience: mathematics (years 6-11)

3.03 Modelling STEM: How to equip students with skills for jobs with a future.

Claire Hughes, RiAus

STEM as an educational initiative has grown in importance during the last decade. Despite students completing more formal education than their parents, many struggle to find relevant and consistent employment. We need to equip students with the skills and knowledge for future jobs but also for jobs with a future.

STEM literacy should relate both to objectives of national economic growth and the development of the individual students in terms of acquiring knowledge, attitudes, and skills to identify real-world problems through an understanding of the specific features of STEM subjects.

Models and modelling can increase relevance and authenticity in STEM education. These processes bridge the gap between STEM disciplines and promote the transfer of knowledge and skills between contexts, both in and out of STEM disciplines.

In this workshop use student-centred, hands-on approaches to model STEM pedagogies. Problem-based learning approaches will draw attention to the importance of STEM careers, disciplines, and the impact of STEM on society.

Target audience: design & technologies (years 6-9), science (years 6-9)

3.04 Arduino programming - Beginners

Paul Gavini, Modbury High School

Hands on activity programming Arduino to collect and report sensor data for data logging in science or the authentic collection of data in the digital technologies' curriculum.

Participants must install the Arduino IDE prior to the event via "https://www.arduino.cc/en/software" (tutorials on YouTube exist regarding the installation) and a FULLY charged laptop.

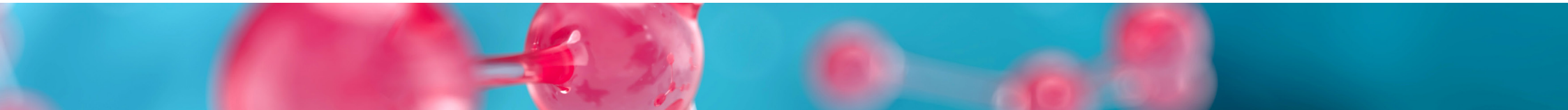
Target audience: design & technologies (years 6-11), digital technologies (years 6-11), science (years 6-11)

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

Stuart Lewis, Scientrific

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

Target audience: design & technologies (years 6-11), science (years 6-11)



3.06 Body-based learning in STEM education

Jennifer Chalmers, University of South Australia

Find out how to get students physically involved in STEM education by using body-based learning approaches to develop understanding (and be prepared to try these yourself). Body-based learning models have been found to assist children's' grasp of the abstract concepts that often exist within science and mathematics. From lesson hooks and prior knowledge learning experiences to models that help explain abstract concepts, this workshop will give you time to try a variety of creative body-based learning strategies to get your learners out of their seats and engaged in the learning.

Target audience: mathematics (years 6-11), science (years 6-11)

3.07 Authentic Investigations using Modelling

Dr Alix Verdon & Dr Matthew Verdon, ASMS

Studying motion is an excellent opportunity for students to use science learning to strengthen numeracy skills and Mathematical understanding. At ASMS we have posed the problem "How can we land astronauts back on Earth safely?" for Year 10 and Year 11 students to deconstruct and investigate. This workshop will explore how integrating the Science and Mathematics learning, with a focus on students creating both scientific and mathematical models, has strengthened learning in both areas. Participants will also have the opportunity to explore how, in either a science or mathematics classroom, opportunities for Science modelling and Mathematical modelling can be combined to provide opportunities to engage students in authentic learning, support differentiation and develop numeracy capabilities while still addressing the required learning outcomes.

Target audience: mathematics (yr 6-11), science (years 6-11)

3.08 Student collected data helping scientists better understand local, regional and global environments

Bill Flynn, CSIRO Education and Outreach

The NASA sponsored GLOBE Program is an international science and education program which promotes learning about the local and global environments through hands-on activities. Models are particularly useful in the study of environmental systems. Scientists use models to examine the fundamental behaviour of a system, such as how carbon is stored in a forest. By knowing more about the system through modelling and understanding where knowledge is incomplete, scientists can generate hypotheses to guide future research.

In this session participants will engage with the GLOBE Program, the hands-on activities and classroom activities which are available to both registered and non-registered GLOBE users. We'll look at how ground-based data collection can be used by scientists to help in our understanding of the global environment. And using an interactive Biomass Accumulation Model how temperature and precipitation may affect biomass accumulation and carbon storage.

Please bring a laptop or tablet to the session enabled for internet access.

Target audience: mathematics (yr 6-9), digital technologies (years 6-9), science (years 6-11)

Session 4

2.55pm - 3.55pm

4.01 Engineering a Monster?

Tisha Beasley & Kyran Zippel, ASMS

The Australian Science and Mathematics School has developed an interdisciplinary STEM course titled "Engineering a Monster?" This teaching program highlights some essential components of both ACARA and SACE science, maths, history and English curriculum that allows teachers to develop effective and engaging lessons that model hands-on STEM skills.

Our workshop will support teachers to develop creative strategies to integrate inquiry and critical and creative thinking into the teaching of multiple disciplines at that same time, including science, engineering, maths, history and English. "Engineering a Monster?" uses a Collaborative Inquiry template, Engineering Maths Challenges, a History Museum template, and an Intertextual Analysis framework that builds student capacity to construct their own learning.

Target audience: science (years 6-11)

4.02 Modelling using First Nations Games

Rebecca Garrett, Trinity College & Desiree Gilbert, AISSA

In this workshop we will look at using First Nations games to model data and promote authentic conversations about First Nations cultures and histories in the mathematics classroom. Presenters Rebecca Garrett (Trinity College) and Desiree Gilbert (AISSA) will discuss the Interface of Mathematics with First Nations Culture and Histories professional learning project and the benefits of the Goompi model for all students.

Target audience: mathematics (years 6-11)

4.03 Differentiation of Tasks in 7-10 Australian Curriculum Science

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: science (years 6-11)

4.04 Ediacara as a resource in Secondary Education

Tory Botha, University of Adelaide

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; Bioloigcal science and, Earth and Space sciences for the years 6-11. These fossils will be an important component in the UNESCO World Heritage nomination of the Flinders Ranges.

Target audience: mathematics (years 6-11), science (years 6-11)

4.05 2+ ways of authentically assessing mathematics

Dr Matthew Verdon, ASMS

Are you looking for ways of authentically assessing mathematics and numeracy across subject areas? Assessment of numeracy and mathematics learning requires high quality evidence of learning, provided by students, and ideally in an authentic manner which rewards complex thinking and transfer. We discuss some methods of students presenting such evidence such as portfolios and oral conversations, the value to students and the learning program, and some of the implementation challenges and opportunities.

Target audience: mathematics (years 6-11), science (years 10-11)

4.06 STEM approaches using Data Loggers

Stuart Lewis, Scientrific

"STEM is science where you think with your hands"

Are you looking for ways of imbedding STEM activities into the Australian Curriculum? Are you looking for a way to revive and extend your existing science equipment.

This workshop explores STEM activities using Vernier Dataloggers. With a Hands-on task, and support from our presenter, participants will use dataloggers to explore different STEM experiments. Topics will include:

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

Target audience: design & technologies (years 6-11), science (years 6-11)

4.07 Digital technologies in science and maths classrooms

Jennifer Chalmers, University of South Australia

The enterprising skills required to be life-long learners, such as creativity, critical thinking and problem solving, are an integral part of STEM education. Students require a broad skill set to adopt and adapt into careers that do not yet exist, solve problems that have not yet arisen and innovate in ways currently unimaginable. One of these crucial skills is digital literacy, however, its place in the Australian Curriculum is vague and often left to teacher choice and interpretation. In this workshop, I will discuss how digital technologies are framed in the latest version of the curriculum and the impact this is likely to have on teaching and learning in science and mathematics. Examples of digital technologies for classroom use will be modelled and time will be given to reflect on your integration of technology in your classrooms.

Target audience: mathematics (years 6-11), science (years 6-11)

4.08 Putting the T and the E in STEM

Alistair Knight, Thomas More College

Even after years of living with this fashionable acronym, there is confusion about the function of the T and the E in STEM, and the implications that has for designing STEM tasks. We'll look at how to ensure that Technology and Engineering are covered (along with Science and Maths) when planning STEM activities.

Target audience: design & technologies (years 6-11), digital technologies (years 6-11), mathematics (years 6-11), science (years 6-11)

Program correct as of 12 October 2022 but may be subject to change without notice.

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SASTA South Australian Science Teachers Association

MASA Mathematical Association of South Australia