

MIC STEM Education Conference:

Book of Abstracts for Day 2

Day 2: Saturday May 23rd

Workshop	Room 1: T213
Session 1:	Teachers involved in PROTECT Erasmus Project through Clare Education Centre
10.15am -	<i>Climate Sustainability Education through the lens of 3 schools on an Erasmus+ Journey</i> (Stages 3 & 4, STEM Areas: S, T, E, M)
11.30am	This workshop provides an overview of an integrated STEM collaborative project involving three schools in the Ennis area. The project is associated with the PROTECT Erasmus + project with partners across Europe. Teachers from the participating schools are working collaboratively between and within schools to explore how primary children across the primary school can authentically engage with the topic of Climate Sustainability. In particular, the project seeks to meaningfully explore this broad real-world issue via the lens of integrated STEM units of instruction. In this workshop, participants will receive the opportunity to experience various STEM methodologies and approaches adopted through active engagement in 3 sample lessons.
	Room 2: T214
	Catherine Mangan and Denise Brislane [Oide Digital Technologies Team] <i>Digital Innovation with Lego Spike</i> (Stage 3, STEM Areas: S, T, E, M) In this hands-on workshop, participants will explore how Lego Spike can support purposeful, curriculum-linked learning in 3rd and 4th class. The session will include clear entry points for participants who are new to the kits, with optional extension pathways for those who already have experience. Using a mix of plugged and unplugged activities, participants will work through practical classroom tasks that build computational thinking and structured problem-solving, drawing on the engineering design process and design thinking. The session is grounded in the Primary Curriculum Framework and links to key competencies such as being a digital learner, so that participants leave with simple, effective ideas ready to use. Please note: participants are asked to bring a device to this session.

	Room 3: T301
	James O'Reilly [Hollyford NS] 3D printing and Computer Aided Design (CAD) in the primary classroom (Stages 3 & 4, STEM Areas: T, E, M) Computer Aided Design (CAD) and 3D printing are increasingly accessible technologies with significant potential to support meaningful learning in primary STEM education. However, their adoption by teachers remains limited, often due to a lack of familiarity with the technologies and uncertainty about their application in primary classroom contexts. This workshop presents a classroom-based case study in which primary school pupils engaged in design-based learning using the web-based CAD platform Tinkercad. Pupils were supported to design digital artefacts, which were then produced using a 3D printer and used for investigation, manipulation, and reflection. The session explores how integrating CAD and 3D printing into everyday classroom practice can support pupils' mathematical thinking, confidence, and attitudes towards mathematics through hands-on, inquiry-driven activity. Particular attention is given to how open-ended design tasks can promote inclusive participation by valuing creativity, problem-solving, and collaboration. Participants will engage directly with Tinkercad through guided, practical activities, examine examples of pupil work, and discuss how the technology was integrated within curricular constraints. The workshop will also introduce the basic mechanics and components of a 3D printer, enabling participants to develop practical confidence and consider how similar approaches could be adapted for their own primary STEM contexts.
	Room 4: T314
	Mairead Ryan, Eleanor Walsh, Maeve Liston [Mary Immaculate College] Buzzing about STEM in the early years: Leveraging Bee Bots to promote STEM (Stages 1 & 2, STEM Areas: T, M) Learning educational robotics (ER) have developed into a promising educational tool to support the teaching of problem-solving (Seckel et al. 2023) and have gained great attraction in the education sector globally (Wang et al. 2023). ER can be described as an influential tool for teaching and learning, encouraging students to use specific programming language to control robots (Atmatzidou & Demetriadis 2016). For several years educators have used ER to support the development of Computational Thinking (CT) amongst primary school pupils. There is a symbiotic relationship between CT and STEM education, whereby both domains work simultaneously to enhance student's learning in both contexts (Orton et al., 2016). Recent STEM education reform, including the introduction of the new Irish primary STEM curriculum in September 2025, has placed increased emphasis on integrated STEM learning in the early years. In response, this hands-on workshop introduces participants to Bee-Bot, a child-friendly educational robot, widely recognised as an age-appropriate resource to develop CT in early years (Seckel et al. 2023). Drawing on constructionist principles and guided, play-based learning approaches appropriate to the early years, participants will learn how Bee-Bot can be integrated across the primary curriculum to support

	STEM learning in both stage 1 and stage 2 classrooms. The workshop provides participants with practical, classroom-ready activities and pedagogical strategies to support the development of CT, problem-solving, and interdisciplinary STEM learning in the early years. The workshop will also share insights from data collected with early years teachers and parents/guardians on the use of Bee-Bot in classroom and educational outreach contexts, offering evidence-informed reflections on its impact on children's learning and engagement. Collectively, the workshop aims to equip educators with both the theoretical grounding and practical tools needed to confidently implement integrated, developmentally appropriate STEM learning experiences in the early years.
	Room 5: T315
	Claire Carroll, Aisling Leavy, Mairéad Hourigan, Michelle Fitzpatrick, Breed Murphy, Mairead Ryan, Anne O Dwyer [Mary Immaculate College] <i>The Great Catapult Challenge: Launching Integrated STEM Learning</i> (Stage: 4, STEM Areas: S, T, E, M) The introduction of Ireland's primary STEM curriculum has increased attention on the need to support teachers in designing authentic, interdisciplinary learning experiences that connect STEM concepts to meaningful real-world contexts. This workshop responds to that need by engaging participants in a hands-on integrated STEM challenge centred on the design, construction, and testing of a working catapult. Positioned within a problem-driven learning context, participants will explore how science, technology, engineering, and mathematics can be meaningfully integrated within primary classrooms through collaborative inquiry and design-based learning. Drawing on engineering design processes, participants will design, build, test and redesign catapults while investigating scientific concepts including forces, motion, levers, and fulcrums. Mathematical learning will be foregrounded through measurement, comparison, and the collection and analysis of numerical data. The workshop also highlights the role of digital technologies in supporting integrated STEM learning. Participants will use an open access maths action technology; CODAP (Common Online Data Analysis Platform); to organise, visualise, and interpret measurement data; experiencing firsthand the affordances of tools can support learners' statistical understandings of the power of large data sets in evidence-based decision-making. Throughout the workshop, emphasis will be placed on practical classroom approaches that support creativity, collaboration, problem-solving, and iterative thinking. As participants engage as learners in a fully integrated STEM experience, they will be encouraged to critically examine the pedagogical decisions underpinning the activity. The session aims to support both practicing and future primary teachers in developing confidence with integrated STEM pedagogies and offers adaptable strategies for implementing authentic, technology-enhanced STEM learning in primary classrooms. Participants will leave with practical ideas, classroom-ready resources, and a clearer understanding of how integrated STEM can be enacted through inquiry, design, and real-world problem solving.

Workshop	Room 1: T213
Session 2: 11.45pm - 1.00pm	Mary Kelly [University of Galway] <i>From Problem to Prototype: Students and Teachers Co-Designing Digital Wellbeing in School</i> (Stage 4, STEM Areas: T, E) As digital technologies become increasingly embedded in school life, educators face a key challenge: how to support students in developing balanced, self-regulated relationships with technology. This interactive workshop draws on a design-based case inquiry conducted in an International Baccalaureate (IB) Middle Years Programme (MYP) context, where students (11-12 year olds) and teachers collaboratively explored patterns of device use and co-designed practical responses to support digital wellbeing. Learning in an IB environment is disciplinary, interdisciplinary, and transdisciplinary based, and this session introduces participants to a student-informed ecological framework for understanding digital behaviour, highlighting the interaction between individual habits, peer dynamics, and school structures. Findings illustrate how factors such as social norms, habit formation, and environmental design can shape students' engagement with both digital and non-digital activities. Aligned with the principles of STEM education, the workshop foregrounds design thinking as a process for addressing complex, real-world challenges. Participants will engage in a structured, hands-on experience that mirrors the inquiry process used in the study. Activities include analysing anonymised student data and insights, identifying key behavioural drivers, mapping influences within their own school contexts, and applying a simplified design cycle to generate context-responsive strategies. A central focus of the session is the role of student and teacher collaboration in shaping sustainable approaches to digital wellbeing. By positioning students as co-designers rather than passive recipients of policy, the workshop highlights how agency, reflection, and shared responsibility can support more balanced digital cultures in schools. Participants will leave with practical and adaptable strategies that can be implemented across a range of educational settings, as well as a deeper understanding of how design-based, participatory approaches can support wellbeing in technology-rich learning environments.
	Room 2: T214 Niamh Kelly [Mary Immaculate College] <i>Full STEAM Ahead - A practical introduction to integrated STEM across all primary class levels</i> (Stage 3, STEM Areas: S, T, E, M) This session designed to support teachers in embedding meaningful, integrated STEM learning across diverse primary classroom settings. It draws on my contributions to a practical STEM magazine developed in collaboration with Clare Education Centre, which showcases adaptable, classroom-ready lesson ideas suitable for a wide range of age groups. The session explores how Science, Technology, Engineering, and Mathematics can be taught in an integrated and engaging way using simple, accessible materials and approaches. Participants will be introduced to a variety of lesson stimuli that can spark curiosity and inquiry, along with practical examples of how these ideas have been implemented across different class levels and school contexts. A

	key focus is on adaptability, demonstrating how each lesson can be modified to meet the needs, abilities, and interests of pupils from early years through to senior classes. Through hands-on activities, participants will experience some of the featured STEM challenges firsthand, encouraging collaboration, communication, and critical thinking. By the end of the session, attendees will have gained practical strategies, ready-to-use ideas, and increased confidence in delivering integrated STEM lessons, with the overall aim of making STEM approachable, flexible, and engaging for all teachers regardless of experience level.
	Room 3: T301
	Claire Carroll and Ayşegül Liman Kaban [Mary Immaculate College] Data Detectives and Problem Solvers: Integrated STEM with micro:bit (Stages 3 & 4, STEM Areas: S, T, M) Integrated STEM education offers powerful opportunities for pupils to engage with real-world problems through inquiry, creativity, and collaboration. A key challenge lies in maintaining clear disciplinary foundations within interdisciplinary learning, especially when students are working in open-ended, technology-rich environments that extend beyond traditional classroom tasks. This interactive workshop explores how the micro:bit can be used as an accessible, low-cost tool to support integrated STEM learning in the primary classroom. Participants will explore how simple sensor-based activities can enable pupils to collect, represent, and interpret real-world data, strengthening connections between mathematics, science, and technology. The workshop focuses on how pupils can take on authentic roles as “data users” and “problem solvers” in real-world contexts, including energy consultants analysing and optimising energy usage, environmental health officers exploring sound levels in local environments, and fitness enthusiasts using movement data to support health and wellbeing goals. Through these scenarios, learners use micro:bits to measure temperature, light, and sound, generating meaningful datasets for analysis. The session will highlight how these activities can be aligned across the primary STEM curriculum. Emphasis will be placed on how pupils engage with the Nature of STEM through exploring real-world applications of science, technology and engineering, investigate contemporary issues around energy and sustainability, develop an understanding of the role of data in the digital world, and use digital technologies to generate, process, and present information. Through these experiences, pupils are supported in posing questions, collecting and representing data, and interpreting findings to draw evidence-based conclusions. Participants will explore practical examples of lesson design, including approaches to implementation, sample pupil tasks, and strategies for working with real-world data. They will have opportunities to experience aspects of the activities firsthand and reflect on how micro:bit-based investigations can be adapted for their own classrooms to support meaningful, integrated STEM learning with a clear disciplinary focus.

	Room 4: T314 Orla Waters, Abbie Glynn & James O'Reilly [Oide STEM Team] Computational thinking: Hands On, Minds On (Stage 3, STEM Areas: T, E, M) This workshop introduces learners to computational thinking through an engaging “Rangers” activity that integrates problem-solving, collaboration, and logical reasoning. Participants take on the role of rangers tasked with navigating challenges that require them to break down problems (decomposition), identify patterns, develop step-by-step solutions (algorithms), and refine their thinking through testing and debugging. Designed as a hands-on, minds-on experience, the activity supports the development of key STEM competencies while fostering creativity and resilience. Suitable for a range of class levels, the workshop demonstrates how computational thinking can be embedded meaningfully across the curriculum, promoting active learning and transferable skills in line with contemporary educational approaches.
	Room 5: T315 Breed Murphy [Mary Immaculate College] Once Upon a Time: Picture Books as a Catalyst for STEM Learning (Stages 1 & 2, STEM Areas: S, T, E, M) This workshop explores how children’s literature, particularly picture books, can be utilised to support the teaching and learning of STEM in junior and middle primary classes. Picture books can provide innovative and stimulating contexts for integrated STEM learning by motivating children to engage creatively with problems, scaffolding their thinking, and supporting the acquisition of scientific and mathematical language. The purpose of the workshop is threefold: to raise awareness of the pedagogical value of picture books in STEM education, to highlight the availability and range of picture books with a STEM focus, and to support participants in designing a coherent unit of work in which picture books are used as a central stimulus for STEM learning. By the end of the workshop, participants will be able to identify high-quality picture books that support STEM learning and design a unit of work integrating literature and STEM. The interactive workshop is structured in three parts. The first section consists of a short presentation outlining the rationale for using picture books in integrated STEM education. Key criteria for selecting appropriate picture books will be presented. The second section involves a hands-on STEM investigation inspired by picture books, with a particular focus on science and mathematics. Participants will engage in activities exploring concepts related to measurement, materials, energy and forces, and living things. The third section adopts a book-tasting format, providing participants with opportunities to explore a selection of picture books, identify embedded STEM concepts, and collaboratively plan an outline of an integrated STEM unit for junior or middle classes, grounded in a selected story.

Workshop Session 3: 1.45pm - 3.00pm	Room 1: T213 Maeve Liston and Eleanor Walsh [Mary Immaculate College] <i>Making STEM Matter: Engineering in Action Through Teacher–Engineer Collaborations for Sustainability</i> (Stages 1-4, STEM Areas: S, E, M) This practical, hands-on workshop demonstrates how core science concepts related to water—pressure, buoyancy, air compression, forces, and flow—can be extended into high-quality, integrated STEM learning through the Engineering Design Process (EDP). Participants will engage directly with a sequence of accessible, classroom-ready science investigations, before applying this learning to real-world STEM design tasks. The workshop explicitly bridges science inquiry and STEM problem-solving, showing how experimental understanding can lead to purposeful engineering design. Working collaboratively, participants will design, test, evaluate, and refine solutions to water-related challenges. These challenges mirror authentic engineering contexts and support systems thinking, creativity, and problem-solving. Grounded in research-informed STEM pedagogy and aligned with the redeveloped Primary Curriculum Framework, the session positions engineering as the integrative element connecting science, mathematics, and technology. Emphasis is placed on learner agency, inquiry-based practice, and inclusive participation, with examples adaptable for classroom, outreach, and teacher-education settings. Room 2: T214 Karen Marry [Scoil Bhríde, Cannistown NS] <i>Unlocking Imaginations: Developing Computational Thinking Through Integrated STEM in the Primary Classroom</i> (Stages 1-4, STEM Areas, S, T, E, M) Aligned to the new Primary STEM Curriculum — supporting teachers to implement age-appropriate engineering and 21st century skills from Junior Infants to Sixth Class. One of the most common questions primary teachers ask when approaching the new Primary STEM Curriculum is: which technology should I be using, and is it right for my class? This workshop answers that question directly, offering a clear, practical roadmap that maps specific digital tools to each class level, ensuring that every child experiences age-appropriate engineering challenges and develops genuine 21st century skills as they progress through primary school. With the introduction of the new Primary STEM Curriculum placing computational thinking, design, and integrated learning at its core, teachers need concrete guidance on how to sequence technology use in a way that builds confidence and capability year on year. This workshop presents a tried-and-tested, four-stage progression developed and refined in the classroom and recognised internationally when selected to represent Ireland at Science on Stage 2022 in Prague, Czechia.
---	--

Each stage pairs the right tool with the right age group: Bee-Bots for Junior and Senior Infants (algorithms, sequencing, science and maths); Scratch Junior for First and Second Class (coding, geography, creative problem solving); LEGO® Spike and Prime kits for Third and Fourth Class (engineering, programming); and the BBC micro:bit for Fifth and Sixth Class (physical computing, sensor design, real-world STEM applications). At every stage, the technology serves the curriculum -not the other way around.

Crucially, this roadmap is designed to be accessible to every school. Where funding or schemes such as STEAM Meath are available, Stages 2 and 3 can be extended through participation in the FIRST® LEGO® League Discover and Explore programmes, giving students a rich competitive and collaborative engineering experience. Where resourcing is more limited, Stage 2 can focus on deepening and consolidating the computational thinking skills introduced in Stage 1, using Scratch Junior as a low-cost, high-impact coding environment, ensuring no school is left behind regardless of budget.

Room 3: T301

Michael Mc Namara [Mary Immaculate College]

Exploring the Use of Virtual Reality to Support and Enhance STEM Learning in the Primary Classroom

(Stages 3 & 4, STEM Areas, S, T, E, M)

This workshop introduces participants to effective pedagogical approaches, teaching resources, and key findings emerging from a collaborative, integrated virtual reality (VR) project undertaken by Mary Immaculate College and Oide Technology in Education. It is designed to provide both a theoretical and practical understanding of how immersive technologies can support integrated STEM learning in the primary classroom.

Throughout the workshop, participants will engage in the design and development of interactive VR environments using pupil-friendly software. Particular emphasis is placed on how such environments can be enhanced through the integration of generative artificial intelligence (GenAI) imagery to support creativity, visualisation, and problem-solving. These activities are framed within the context of the United Nations Sustainable Development Goals, with a specific focus on SDG 4: Quality Education and SDG 14: Life Below Water, enabling participants to explore meaningful, real-world applications of STEM learning.

The workshop is underpinned by the five-phase integrated STEM learning approach advocated in the STEM Education Specification, supporting a structured yet flexible model for inquiry-based learning. Participants will also have the opportunity to experience their creations firsthand through VR headsets, thereby gaining insight into the immersive and experiential nature of this approach.

By the end of the workshop, participants will have developed a deeper understanding of the pedagogical affordances of VR in education, as well as practical insights into how such approaches can be effectively implemented within the Irish primary school context.

	Room 4: T315 Claire Carroll, Michelle Fitzpatrick, Mairéad Hourigan, Aisling Leavy, Breed Murphy & 4th year MIC maths specialism student teachers <i>Where Maths Meets Minecraft: Game-Based STEM Learning with a Mathematical Core</i> (Stage 3 & 4, STEM Areas, T, M) Recent curriculum reform in Ireland has positioned integrated STEM education as central to primary teaching and learning, with the NCCA (2023; 2025) emphasising interdisciplinary learning alongside strong disciplinary foundations. While integrated STEM offers rich opportunities for inquiry, creativity, and real-world problem-solving, research highlights an ongoing challenge in ensuring that mathematics remains visible, conceptually rigorous, and meaningfully embedded within STEM experiences. This interactive workshop explores digital game-based learning as a powerful approach to addressing this challenge. Drawing on a Minecraft Education–based project in initial teacher education, the session demonstrates how mathematically rich, integrated STEM learning can be designed and enacted through immersive, student-centred environments. Participants will engage with five classroom-implemented lessons, each foregrounding a key mathematical concept (area, volume, transformations, data, and coordinates), across three strands of the primary mathematics curriculum. These lessons are situated within authentic, cross-curricular contexts, inviting learners to step into the world of STEM professionals, taking on roles such as marine biologists on a fishing expedition, theme park designer designing an amusement park, graphic designers creating pixel art, and more. The workshop will provide practical insights into lesson design and implementation, including learning outcomes, classroom activities, and supporting resources. It will also share pupil perspectives, highlighting common understandings and misconceptions that emerged through gameplay. Throughout, particular attention is given to how mathematical thinking can be made explicit and sustained within integrated STEM tasks. Participants will have opportunities to experience elements of the activities firsthand and to reflect on the pedagogical possibilities and challenges of using game-based approaches in their own classrooms. The session aims to support teachers in designing engaging, interdisciplinary STEM learning experiences that maintain a clear and purposeful focus on mathematics.
Workshop Session 4: 3.00pm - 4.15pm	Room 1: T213 Shannan Mulrooney [Maia Build Lab] <i>Child-Led STEM Play with KEVA Planks: Dream, Design, Do</i> (Stages 1-4, STEM Areas: S, E, M) Maia Build Lab is a six-week, facilitator-led school-based programme designed to support integrated STEM learning through open-ended KEVA construction challenges. In line with the conference theme of preparing a future-ready generation, the approach meaningfully connects Mathematics, Engineering and Science through design-based, inquiry-driven learning experiences. Each week, children are invited to dream, design and do as they engage in a new open-ended STEM challenge. These experiences promote exploration of key concepts such as balance, symmetry, measurement, force and structural stability, while also fostering critical thinking, creativity, collaboration and

resilience. The open-ended nature of the materials ensures inclusive participation, allowing children of all abilities to engage meaningfully and at their own level.

Led by an experienced facilitator, Maia Build Lab balances child-led exploration with intentional teaching. For selected weeks, pre-teaching discussion prompts support the introduction of key concepts, while all sessions include follow-up prompts to extend thinking, encourage reflection and strengthen links to the Primary Curriculum Framework. Workshops can also be tailored to individual school priorities, themes or areas of focus, ensuring relevance across diverse contexts.

Maia Build Lab has been created by Shannan Mulrooney, a primary school teacher with a Master's in Early Years Leadership and Advocacy. Trial workshops delivered in schools to date have been met with strong engagement and positive feedback, with teachers noting the depth of thinking, collaboration and sustained focus demonstrated by children during the workshop. Bookings are now open for the upcoming academic year for schools wishing to embed this six-week programme within their own context.

Room 2: T301

Keith Young [Mary Immaculate College]

AI Literacy in Primary STEM: Investigating, Questioning and Training AI Systems

(Stage 4, STEM Areas: T, E)

Artificial intelligence is increasingly shaping how children search for information, create media, encounter recommendations and make sense of the world around them. For teachers, this creates an important opportunity: to help pupils understand AI not simply as a tool to use, but as a set of systems that can be investigated, questioned, designed with and critiqued. This practitioner workshop introduces practical ways to bring AI literacy into primary STEM education.

Connecting with the Technology strand of the STEM education specification this workshop combines the draft AI Literacy Framework for Primary and Secondary Education with selected tools from the Generation AI project. Participants will first be introduced to core AI literacy competences, including understanding how AI systems work, evaluating their social and ethical impacts and considering how learners can participate meaningfully in an AI-rich society. They will then engage with hands-on, classroom-ready activities using browser-based tools.

Through these activities, participants will explore how pupils can investigate machine learning, classification, recommendation systems, profiling, language models and algorithmic bias in age-appropriate ways.

	Room 3: T314 Claudia Fraga [European International School of Barcelona] Sound Sense: Addressing Children's Alternative Conceptions of Sound through Integrated STEM (Stages 3 & 4, STEM Areas: S, T, E, M) Research in primary science education consistently shows that many children hold robust alternative conceptions about sound, including beliefs that sound is a material substance, that louder sounds travel faster, or that pitch affects speed. Findings from a recent study with upper primary pupils highlight the persistence of these misconceptions and the need for explicit, inquiry-based experiences to support conceptual change. As Ireland implements its new Primary STEM Education Specification, there is a clear need for practical, accessible strategies to surface and address these ideas through integrated STEM learning. This practitioner workshop translates research on children's alternative conceptions of sound into hands-on, low-cost STEM activities that can be readily implemented in primary classrooms. Participants will begin by completing a short version of the diagnostic questionnaire used in the study, modelling assessment for learning and highlighting intuitive ideas that shape children's reasoning about sound. The session will then introduce a series of simple investigations using everyday materials such as tuning forks, balloons, cups, string, paper and digital tools. These activities make vibration visible, explore how sound travels through different media, distinguish between amplitude and frequency, and challenge assumptions about pitch and speed, while purposefully integrating science, technology, engineering and mathematics. Throughout, there will be explicit links to the Primary Curriculum Framework's principles of engagement, creativity, inclusion and evidence-based pedagogy, as well as key competencies such as being an active learner, being mathematical and being a digital learner. Participants will leave with practical strategies, diagnostic tools and adaptable activity ideas that support conceptual understanding of sound while fostering curiosity, collaboration and problem solving, enabling them to confidently enact the new STEM curriculum through meaningful, research informed interdisciplinary learning. Room 4: T315 Chris Reina [Makermeet IE] Cardboard Creations (Stages 1-4, STEM Areas: S, T, E, M) Using child-safe tools specifically designed to cut, fold, and "Scru" cardboard, workshop participants will be encouraged to let their imagination loose and construct anything their hearts desire in minutes. Houses, Cars, Castles, Crocodiles, Angelfish, Snakes and Arcade Cabinets are just some of the crazy fabrications we've seen spring forth during these innovative STEM workshops.
--	---