

## Marshall Cavendish STEM Academy

STEM education has reached the point where the interest in it is 'an almost universal preoccupation' (English, 2016). Studies conducted by Ainley et al (2008) showed that the experiences of students in the primary and early secondary years of schooling can establish a 'series of competence that students have in the foundations of mathematics and science and can kindle their interest in science related fields'. According to DeBacker & Nelson (2000), an early interest in STEM topics can be a predictor for eventual career intentions. Hence, primary school provides an optimum time when gaps in STEM knowledge and understanding can be addressed.

In the "STEM education in Asia Pacific" survey conducted in October 2017, 1580 secondary school students and 560 teachers in Australia, China, Hong Kong, Japan, Korea, Singapore and Taiwan were polled to understand what motivates students to study STEM. Key findings showed that more than 80% of the students feel that quality of teachers (who make classes fun and subjects interesting) is important in motivating them to study STEM subjects. Yet less than 30% of teachers completely agreed that their schools provide opportunities and or funds for their professional development. In

addition to limited access to professional training, STEM teachers in the Asia Pacific region say their biggest challenge is that the current teaching methods are not focussed on cultivating students' passion in STEM.

In view of these findings, it is logical and imperative that intervention strategies aim to build up educator capacity in STEM education and related science communication. Educators will be better positioned to provide the type of experiences that enable students to develop STEM literacies and the critical 21st century skills especially communication skills necessary for the knowledge-based economy.

### Learning Outcomes

Through the workshops, participants will have the knowledge and skills to

- Understand STEM education and science Communication practices;
- Identify, apply and evaluate STEM and science Communication programmes and strategies for diverse audiences, using a range of means, media, and technologies;
- Enhance their STEM literacies and develop lifelong learning habits.

### STEM in the World of Education

STEM101

#### STEM Education and the 21st Century Competencies 9781099103681

The module provides educators with an introduction to STEM development around the world. Experts will showcase the implementation of STEM in different countries through the design of STEM frameworks. These frameworks help teachers structure an integrated approach to implementing STEM curriculum. The cyclical and iterative nature of the STEM framework promotes active learning, student engagement and enhances 21st century competencies.

STEM102

### **Curriculum, Assessment and Pedagogy in STEM 9781099103698**

Leveraging on selected Curriculum Framework, this module will enable educators to gain an overview of the aims and goals of the STEM education. The module will also explore the approaches and pedagogies to integrate the STEM disciplines in formal and informal curriculum and how assessments may be conducted.

STEM103

### **Implementing STEM in context 9781099103704**

This module will equip educators with the basic knowledge and skills related to “STEM in the World of Education” series. Educators will be able to implement the learning materials and related skills such inquiry skills, computing skills of coding, 3D printing and engineering literacy skills. Educators will be better positioned to spark students’ interest and motivation to solve everyday challenges related to STEM.

STEM201

### **Experiential Learning in STEM 9781099103711**

The module will provide educators with opportunities for experiential learning through the 12 STEM activities. Educators will get to know the guidelines to infuse the activities within the curriculum as well as conducting demonstrations. Educators will explore how to conduct fair tests, make refinements to their activities and extend or enhance the learning in STEM.

STEM104

### **Ideation and Lesson Planning in STEM 9781099103728**

Leveraging on their learning from the “STEM in the World of Education” series, educators will create STEM ideas aligned to the curriculum. As part of the final assessment, educators will be expected to craft lesson plans for their STEM ideas to demonstrate their understanding of STEM education.

STEM105

### **Fundamentals of Science communication and practices 9781099103889**

The workshop will provide participants a general understanding of public awareness of the science movement and STEM education, its problems and the current directions. Participants will be aware of its implications for life-long learning and for teaching of science in formal and informal settings.

Participants will explore how to make learning easier and in context; of personal, social and economic importance to the learners.

<sup>†</sup>All our programmes are customisable in duration and context.

STEM106

### **Making sense of Communicating Science 9781099103896**

Participants will learn to understand the language of science, often complex and specific. Participants will learn how to facilitate learners' learning better when the science can be delivered using different modes of representation from concrete, verbal, visual, symbolic to gestural modes. The learning experiences may take the form of engaging communication practices like interactive dialogues, "hands-on and minds-on" experiments, demonstrations and purposeful oral presentations. Through the workshop, participants will also learn to identify and address misconceptions in science which have a negative impact on the learning of science. Opportunities will also be provided for participants to develop creative activities e.g. portfolios and use of media like 'Kahoot' to enhance the teaching and learning of science and evaluate their use.

STEM107

### **Science communication in the classrooms 9781099103926**

In groups, participants will use a science activity of their choice to illustrate the principles they have learnt related to the teaching and learning of science. The learning will model what happens in classrooms to ensure a greater success of communicating science and implementation of STEM education.

STEM108

### **Science Communication and Social Media 9781099103919**

The workshop will explore how new media (like Twitter, YouTube and Facebook) is playing an important role in shaping how information and influence spread among the public sphere. New media is providing greater opportunities to connect with science, especially with audiences of different educational backgrounds where online science sources may be helping to narrow knowledge gaps caused partly by science coverage in traditional media that tends to be tailored to highly educated audience. Participants must become cognizant of new media or risk creating a future where new media have a greater impact on public views about science than the specific research that scientists are trying to communicate. This workshop will also provide guidance for participants on the usage of new media at appropriate times in engaging learners and help to shape their science knowledge and opinions.

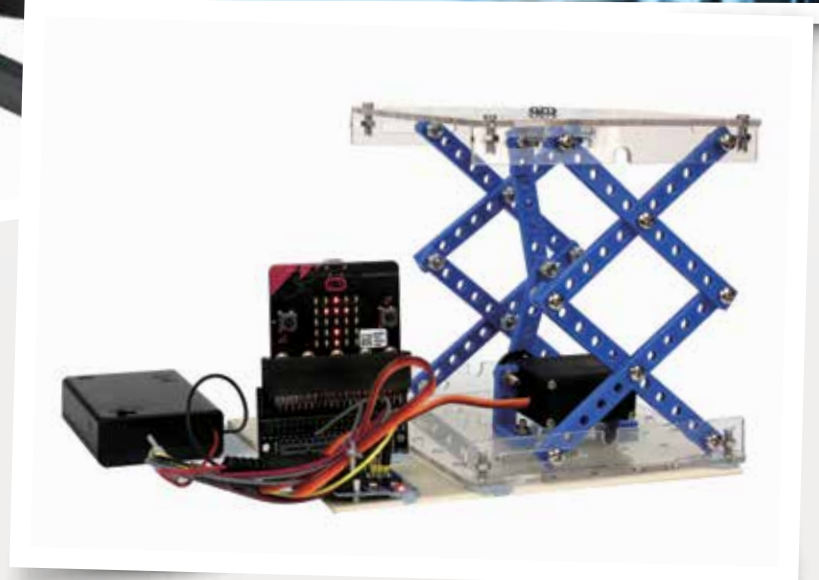
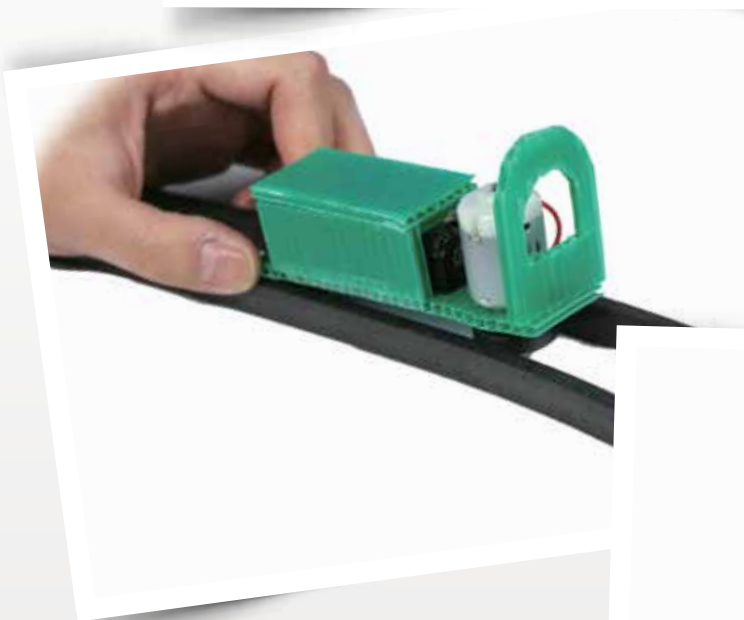
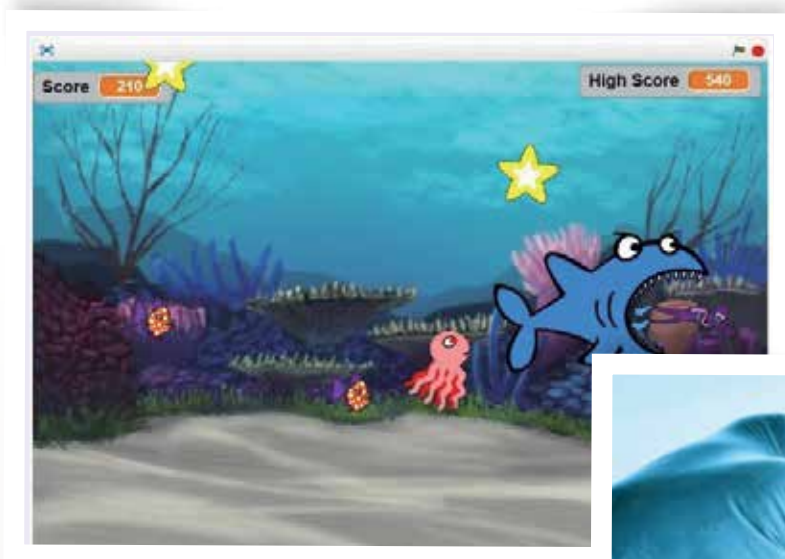
STEM109

### **Outreach within Reach 9781099103902**

This workshop will explore how to reach the unengaged segment in science with differently-framed communication, education or engagement activities from our "traditional" approaches. These include strategies to go where unengaged people are such as the street corners, malls, skate parks and talking about outcomes of science such as cosmetics, food fads and then concentrating on how the technology was used and why, understanding that talking about an application can lead to talking about science ideas but not the other way around.

## Ethics, issues and Consequences of Science 9781099103872

This elective workshop will examine the aims of science education in different educational systems with respect to the practice of science and the ethical and cultural influences. This workshop will provide opportunities for participants to delve deeper and address the challenge of knowing what is the “right” thing to do, what should or “ought” to be done in the face of moral dilemma. Participants will also explore how to introduce the concepts related to ethics and values into their teaching. In addition, as a novel way to address the ethics and issues of science, science practitioners like medical experts, ethics committee members and public will dialogue with the participants leveraging on authentic case studies and situations.



<sup>†</sup>All our programmes are customisable in duration and context.