

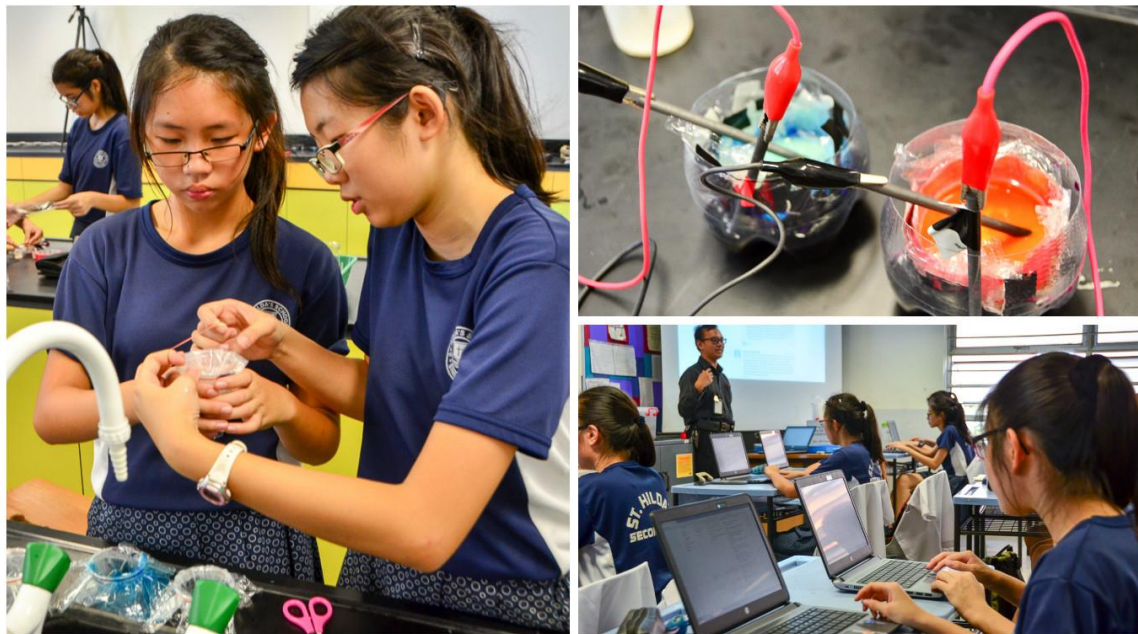
STEM Programmes

1. Microbial Fuel Cells (MFC) Programme

This year, SHSS collaborated with the National Institute of Education to develop an integrated science enrichment programme for Secondary 2 students as part of the Higher Ability Programme. This programme was conducted during the Scientific Thinking Programme (STP) periods and spanned across a total of 10 weeks.

Through the pedagogy of Design-based Inquiry, students were taught new science concepts, and were also required to apply their process and thinking skills in designing and building working models of microbial fuel cells (MFC), which produce small amounts of electricity with the help of microorganisms like yeast or bacteria. With the guidance from teacher advisors, students worked in groups to create MFCs with the best performance characteristics.

Besides imparting to them 21st Century Competencies like Critical and Inventive Thinking (CIT); Communication, Collaboration and Information (CCI) skills, the MFC programme has also provided students with an invaluable experience on how a real scientist works – where the learning is dynamic and without fixed answers.



2. PET Rocket

(a) Level-wide programme

The objectives of the PET Rocket Programme are to create interest in the students in rocket science; to enable them to learn skills relating to engineering, failure analysis, teamwork, human relations and ICT.

(b) National and International PET Rocket competition

In 2015, selected students from Sec 3 participated in the Annual National PET Rocket Competition, as an in-depth extension to the level-wide PET Rocket programme.

2011 PET Rocket Results:

- Precision 60m target
 - Individual category: Champion
 - School challenge: 5th

- Parachute System
 - Individual category: 1st, 4th, 7th, 8th
 - School challenge: Champion (for 2009, 2010 & 2011)

2012 PET Rocket Results:

- Precision 45m target
 - Individual Category: 1st, 3rd and 8th
 - School Challenge: 2nd

- Precision 60m target: 12th

Tan Yong Hua from 2E was selected to represent Singapore at the International PET Rocket Competition in Kuala Lumpur, Malaysia and he emerged as the champion of the competition.

2013 PET Rocket Results:

- Precision 45m target
 - Individual Category: 3rd, 4th, 5th, 6th
 - School Challenge: Champion

- Precision 60m target
 - Individual Category: 13th, 14th
 - School Challenge: 2nd Runner up

Sarah Yeoh from 2E was selected to represent Singapore at the International PET Rocket Competition in Hanoi, Vietnam.

2014 PET Rocket Results:

- Precision 45m target
 - Individual Category: 5th
 - School Challenge: 1st Runner up

Amelia Chan Shiqi from 2E was selected to represent Singapore in the International PET Rocket Competition in Tokyo, Japan.

2015 PET Rocket Results:

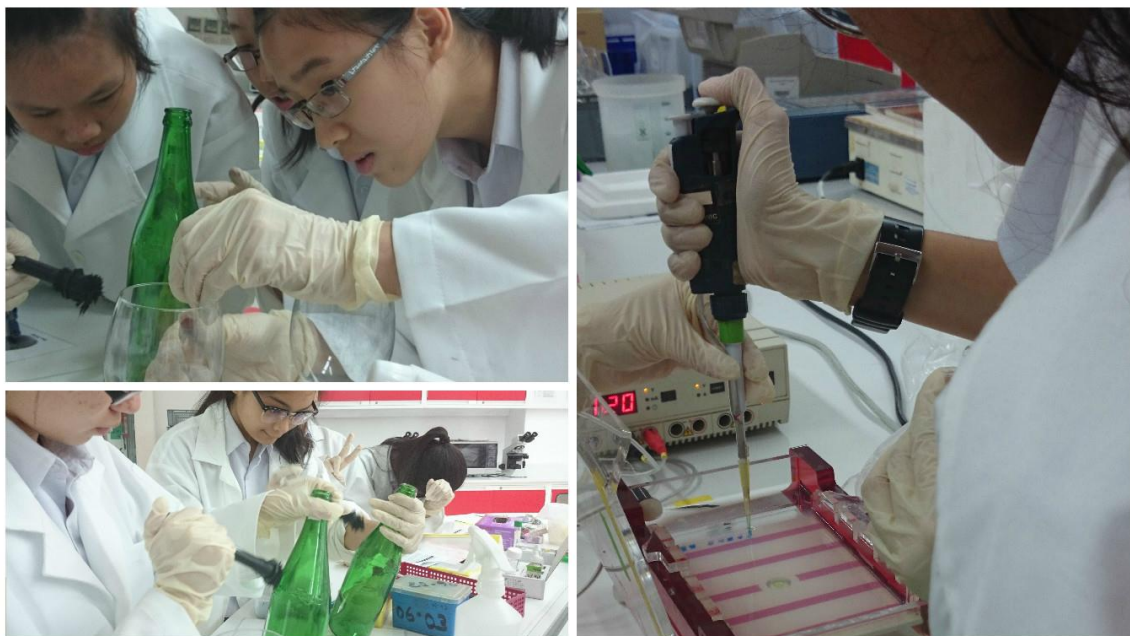
- Precision 60m target
 - Individual Category:
 - School Challenge: 2nd Runner up

Koh Ming Xuan from 3A was selected to represent Singapore in the International PET Rocket Competition in Bali, Indonesia.



3. Forensic Science Workshop by Ngee Ann Polytechnic

The Forensic Science Workshop is conducted by Ngee Ann Polytechnic, School of Life Sciences and Chemical Technology. In the workshop, students learn how to do DNA Extraction and profiling, fingerprint lifting, microscopy and blood-stain detection. In addition, the students get to experience how it is like being a forensic scientist by solving a case. They need to apply problem solving skills and the techniques they have learnt from the workshop, in order to solve the case and find the murderer. After the workshop, students can also participate in the Amazing Forensic Science Challenge organised by Victoria Junior College.



4. The Amazing Forensic Science Challenge

The Amazing Forensic Science Challenge is a competition organised by Victoria Junior College for all upper secondary school students in the East Zone. Teams were required to attend a Forensic Science Workshop before participating in the competition. In this competition, teams get to pit their detective skills against other teams and also learn useful forensic science skills in the process.

- 2014 The Amazing Forensic Science Challenge Results
 - 3rd runner up
- 2015 The Amazing Forensic Science Challenge Results
 - Certificate of Participation



5. Biology Field Trip

The Biology fieldtrip for Sec 3 Express students is conducted yearly during the post-exam period. Students have been brought to Bukit Timah Nature Reserve, Labrador Park and Kent Ridge Park to learn more about the flora and fauna, history of the reserve as well as conservation efforts by the government at these locations.

The main objective of this fieldwork is for students to experience inquiry learning using a simplified adaptation of the 'How Science Works' framework (<http://undsci.berkeley.edu/article/scienceflowchart>). In the process, students develop 21st Century skills (i.e. CIT, CCI) as they analyse their data collected, form conclusions and communicate their findings and conclusions to their peers. After completion of this fieldwork project, students should show appreciation for nature and understand the importance of conservation efforts in Singapore.

6. Chemistry Appreciation Programme: Simply Science

During this workshop, students were able to apply what they have learnt in Chemistry in converting used cooking oil into commercial liquids or bar soaps using a simple technology and understanding the chemical reactions involved in soap-making process. Students also gain awareness on the importance of recycling through this workshop.



7. Physics Enrichment Programme: Physics Workshops conducted by the Science Centre

Sec 3 Express students attended three workshops conducted by the Science Centre. Students were challenged to apply the concepts that they have learnt in school to various real-world contexts such as building a rocket, designing an aircraft and flight science.

