



SALESIAN ENGLISH SCHOOL  
慈幼英文學校

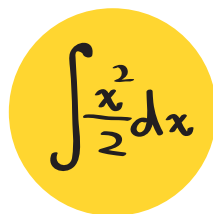
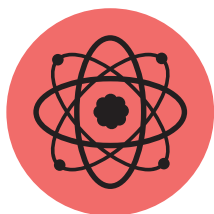
# STEM

Science @  
Salesian 7

Produced by  
STEM Team - Salesian English School

# STEM Introduction

Welcome to Salesian English School! Welcome to the world of science and mathematics! In this issue, we will show you how we inspire and equip our students in the world of STEM (Science, Technology, Engineering and Mathematics)! Let us share with you the happy moments of learning science in our school in the past few years.

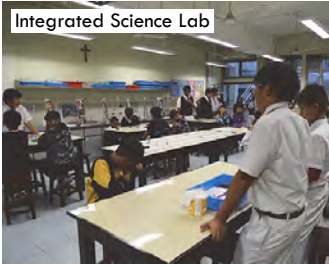
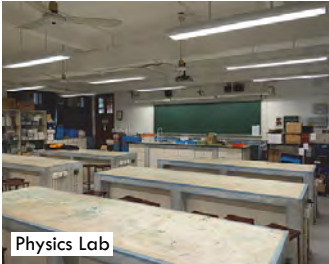


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# Campus and Facilities

STEM activities are usually held in laboratories around our campus. From experiments to research and to inventions, students can perform their investigative works and join workshops with the aid of our facilities in these labs.



## Minecraft campus tour

Want to have a quick tour to our campus? Our alumni spent almost 5 years to create a virtual campus using Minecraft with beautiful rendering modification. Enjoy!



# Integrated Science

## Activities in Junior Forms

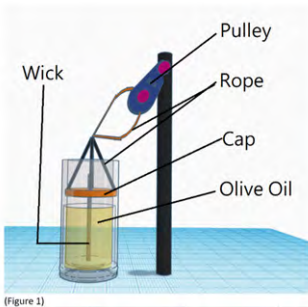
Creativity is the key to success in science. We organised different in-house workshops and competitions for our talented youngsters. We also nominate students to external tertiary institutes for more focused learning.

## Water rocket competitions

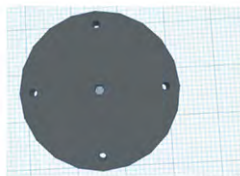
Every year we organise an inter-class water rocket competition for all S2 students. They will learn the basic physics behind water rocket design during Integrated Science lessons, and then by teamwork and creativity, they design their own rockets to travel as far as possible.



## Gifted education in Science lessons



(Figure 1)



(Figure 2\_cap)

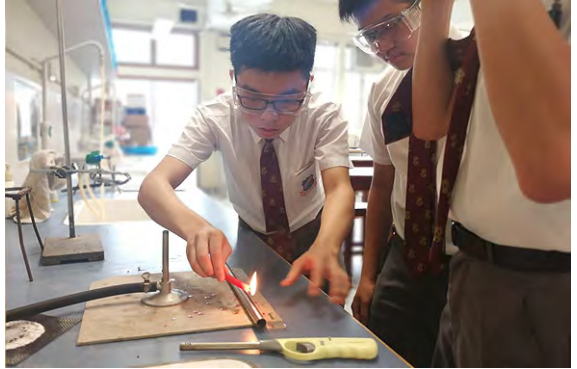
There are different tiered STEM activities implemented in Integrated Science lessons. For example, in an experiment on candles, S1 students need to design oil lamps for different purposes, such as serving as a timer or a lamp with manual brightness control.



# Integrated Science

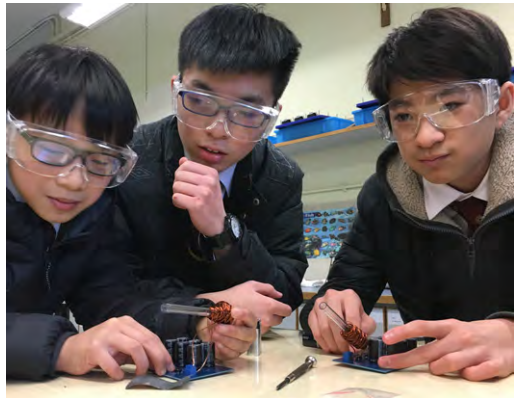
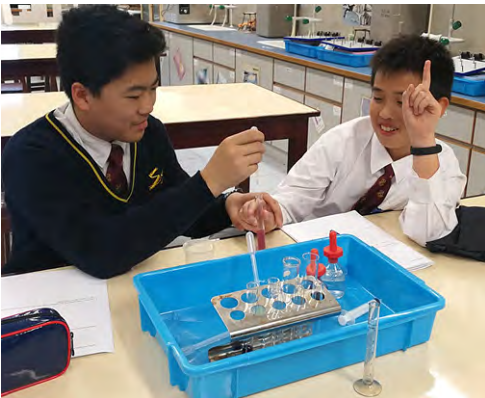
## Gifted Education - Science Workshops

We organised science elite programmes for our junior students to foster their interests in science by doing hands-on projects and learning the theories behind.



## Science Ambassador

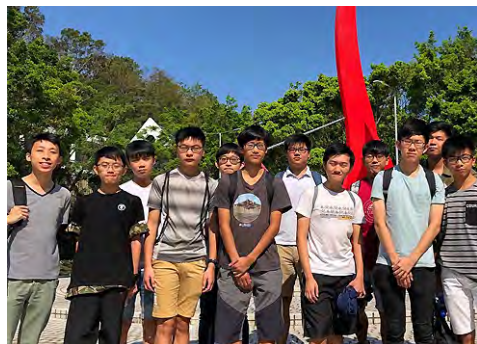
We also prepared a pull-out science programme for junior form students with keen interest on science. For example, students once learned how to make a Gaussian gun and test them during a workshop.



# Science

## Biology

We participate in the STEM workshops organised by universities for our Biology students to get a taste of university education. Some of our students joined HKUST's wetland ecology workshop to learn more about the organisms in local wetland habitats.



## Chemistry

Some of our Chemistry students also joined another STEM experimental workshop organised by the HKUST. Interesting experiments like “The Mystery of colourful fountains”, “The chemistry of egg” not only aroused students' curiosity in Chemistry, but also enhanced their understanding of some Chemistry topics.



## Physics

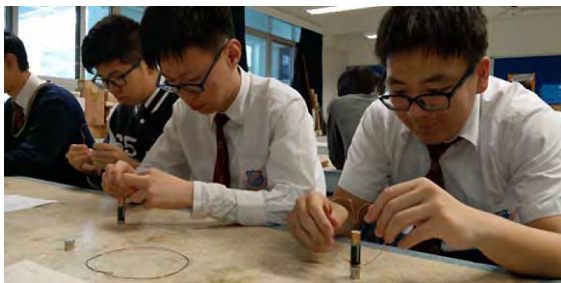
The Physics department always invite distinguished alumni to share with students about their journey in physics. For example, 2016 graduate Kyle Lau once shared with us about his university life and his internship in European Organization for Nuclear Research (CERN).



# Science

## Science Club

Students can also enrich their experience in science through our science club, which organises interesting activities with different themes after school.



## Science talks

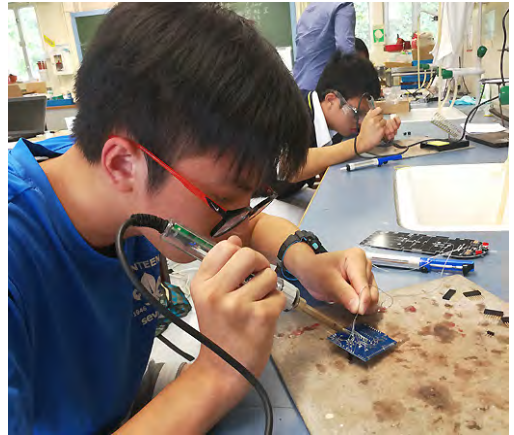
We also cooperate with local universities to organise popular science talks in the campus. We once invited the renowned Dr. Jason Chan (Dr. Fire) from HKUST to give an interactive lecture on fluorescent chemicals to S4 students!





## Remote car Arduino workshop

With the use of the STEM Grant from the EDB, we organised a series of workshops for our senior form science elites on the making of remote control cars with basic soldering training. Together with the use of Arduino to control the vehicles, students used their cars to play a "soccer competition" in the last workshop. Students found it really challenging and fun!



## Programming Design Club

Each year, our Programming Design Club organises a series of workshops to our students, including the App Inventor workshop, where students can create their own apps and use it on their own mobile devices. They also help in the school promotion day by organising workshops to introduce the concept of coding to parents and primary school students.





# Technology

## Hong Kong Art Festival - Light art

In 2017, we are invited by the Hong Kong Arts Festival to participate in an outreach program. We experimented on the use of different sensors and LED technology in our interactive art installation, which also blended with the history of our school and the Shau Kei Wan community around us.

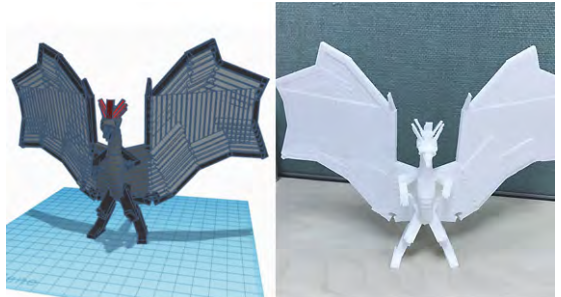


We are also honoured to have a world-renowned artist, Jen Lewin, to visit our school and conduct a mini-workshop to our students on interactive light art.



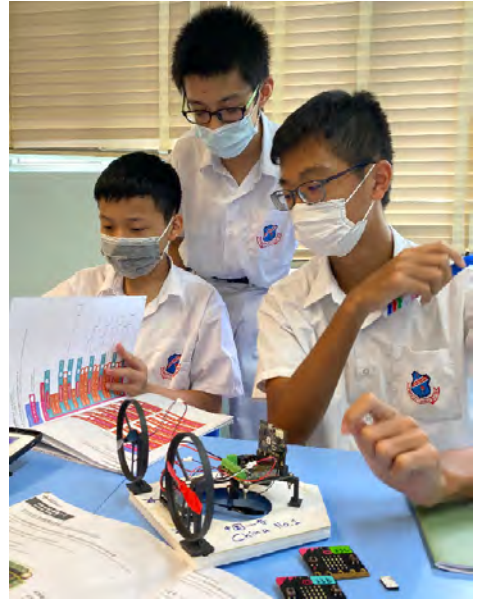
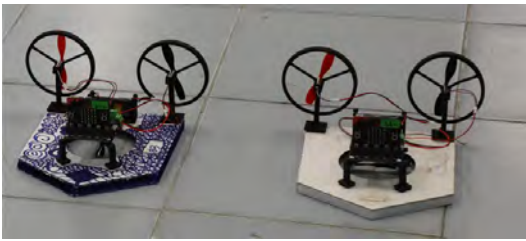
## 3D Printing

We also integrated the use of 3D printing in junior form Visual Arts lessons. Our students make use of their creativity and design skills to make their models.



## Micro:bit Hovercraft Workshop

Despite the pandemic last year, we managed to arrange a STEM activity for all S3 students during the post-exam period. The competition requires students to design a hovercraft model and make use of coding knowledge to complete a race competition. Owing to the pandemic, we need to run in sessions, but all students enjoyed it a lot.



## LEGO World Robot Olympiad (WRO)

WRO HK is an annual robot competition using Lego EV3 Mindstorm robots and programming to perform challenging tasks. Our robotics team has been participating in the competition since 2014 and has won the Gold Lego Prize several times already!



## Robotics club

Our robotics team is one of the main forces in putting forth the STEM education. They have regular meetings after school to learn coding and setting the LEGO robots and VEX robots. It is also their duties to promote robotics to junior form students and visitors during open days.





## Activities in Junior Forms

We integrate the Robotics and coding into regular computer lessons so that all S2 students have a chance to explore and learn how to control the robots to accomplish different tasks. For interested students, we also offer them to join our robotics teams to have further trainings by joining different competitions.



## Robotics Intelligence DIY (RIDY)

RIDY is a robotics competition focusing on skills in instant problem-solving, robotic design, component assembly as well as programming. Our robotics team members' hard-work and programming skills had earned us some prizes in the previous years!





## First® Lego® League Challenge

The competition requires good team work and coding knowledge in completing assigned tasks. This year, our students chose SPIKE™ Prime in the competition. This is a new type of robot kits that we want to explore and pick new coding skills.



## RoboMaster Youth Tournament HK

RoboMaster is a popular robotics competition organised by the DJI Education among tertiary institute. Last year, they launched for the first time for secondary schools in Hong Kong — RoboMaster Youth Tournament Hong Kong 2020. This competition aims to foster youth in integrating engineering knowledge, coding and operating skills, as well as problem-solving, tactics and team building in one go. We are honoured to participate in the competition. The competition is in battle format and our students enjoyed much from it.



## Mathematics Olympiad

For students who love solving challenging mathematical puzzles, our maths team provides ample training and chances for them to participate in mathematics competitions of different levels. From Hong Kong International Mathematics Olympiad to the Greater Bay Area Competition, our maths elites have really outstanding achievements every year!



## Elite programmes - Summer

As a means of training up our elite students beyond the formal curriculum, advanced skills and questions at the DSE level would be discussed in the summer courses for those who are interested in mathematics.

8.  $\triangle ABC$  is an isosceles triangle,  $AB=AC$ ,  $\angle A=36^\circ$ .

①  $\angle BDC = 36^\circ$   
 ②  $\angle ABD = 36^\circ$   
 ③  $\angle ADB = 108^\circ$   
 ④  $\angle BDC = 36^\circ$   
 ⑤  $\angle BCD = 72^\circ$

9.  $\triangle ABC$  is an isosceles triangle,  $AB=AC$ ,  $\angle A=36^\circ$ .

①  $\angle BDC = 36^\circ$   
 ②  $\angle ABD = 36^\circ$   
 ③  $\angle ADB = 108^\circ$   
 ④  $\angle BDC = 36^\circ$   
 ⑤  $\angle BCD = 72^\circ$

10.  $\triangle ABC$  is an isosceles triangle,  $AB=AC$ ,  $\angle A=36^\circ$ .

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 ③  $\angle ADB = 108^\circ$   
 ④  $\angle BDC = 36^\circ$   
 ⑤  $\angle BCD = 72^\circ$

11.  $\triangle ABC$  is an isosceles triangle,  $AB=AC$ ,  $\angle A=36^\circ$ .

①  $\angle BDC = 36^\circ$   
 ②  $\angle ABD = 36^\circ$   
 ③  $\angle ADB = 108^\circ$   
 ④  $\angle BDC = 36^\circ$   
 ⑤  $\angle BCD = 72^\circ$

12.  $\triangle ABC$  is an isosceles triangle,  $AB=AC$ ,  $\angle A=36^\circ$ .

①  $\angle BDC = 36^\circ$   
 ②  $\angle ABD = 36^\circ$   
 ③  $\angle ADB = 108^\circ$   
 ④  $\angle BDC = 36^\circ$   
 ⑤  $\angle BCD = 72^\circ$

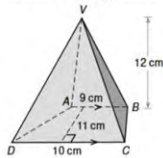


## Elite programmes - Online

As a means of enhancing higher order problem solving skills, a series of online chapter quizzes, full of challenging questions, is set up for elite students who will be awarded based on their performance.

Q2

In the figure, the height of the pyramid  $VABCD$  is 12 cm, and its base  $ABC$  volume of the pyramid.



- A.  $418 \text{ cm}^3$
- B.  $832 \text{ cm}^3$
- C.  $1644 \text{ cm}^3$
- D.  $2496 \text{ cm}^3$

3	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>	(1)
4	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>	(1)
5	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>	(1)
6	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>	(1)
7	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>	(1)
8	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>	(1)
9	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>	(1)
10	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>	(1)
11	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>	(1)
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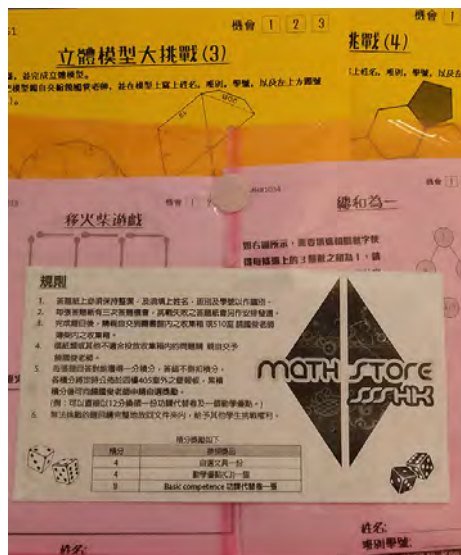
## MATH Week

For the fun side, our mathematics society organised the Mathematics Week and also the orienteering activities for S1 students every year. Students can play with the math puzzles and other booth games there.



## MATH Shop

We always seek chances to promote the fun of solving mathematics problems. We placed a folder containing hundreds of math and IQ questions (eg: Sudoku, Origami and Olympiad math questions) in each S1 and S2 classrooms. Students were free to try any of them in the recess, lunchtime and after school. Students will be awarded prizes for correct answers.



## Maths promotion activities

As part of the school promotion activities, the members of the Mathematics Club in our school design workshops for primary school visitors every year. Our students delivered a maths game in the form of interactive drama, and participants had lots of fun while using a mathematical mind to win the game.





# Mathematics

## S1 Orienteering

As an activity of enhancing the communication skills in English, all S1 students had to visit 10 checkpoints and complete the tasks related to Mathematics, Science or English. S1 students were required to work as a team and solve the problems with creative ideas.



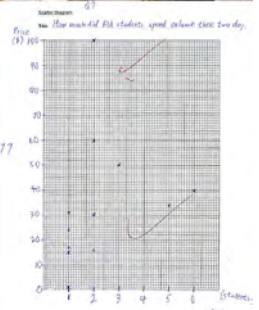
## S1 Cross-curricular project

A statistical project for students which integrate the knowledge and skills learnt in English, Computer and Mathematics. The themes are different each year. Students have to design questionnaires for research using English, analyse the data using statistical methods learnt in mathematics lessons, and finally visualise the findings by using data plotting software taught in computer lessons for presentation.



Questionnaire: Q1  
The rating for the question of PEI students

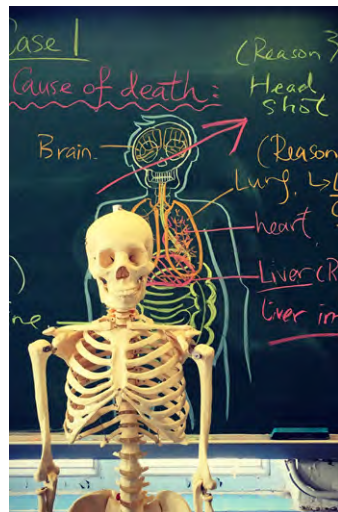
Rating (10)	Rating (1)
0	0 7 7
5	0 0 5
6	0 5
7	0 0 0 0 5
8	0 0 0 0 0 6 7 7 7 7 7
9	0
10	0



# Cross curricular projects

## English Speaking Day - Forensic tasks

From time to time, we add STEM elements to enrich language-learning experience in our school. We once combined our English-Speaking Day event with a mock autopsy session, which students learnt about how to deduce the cause of death of a “victim” in a crime scene.



## Language Carnival

Students also built mechanical arms using syringes and wood planes, which are then used for junior form students to play games using English during our Language Carnival funfair.



# Self-directed Learning

## Integrating STEM in our curriculum



In order to equip our teachers better with the knowhow in integrating STEM in curriculum, we participated in a joint project with the Centre for Information in Education, The University of Hong Kong in 2020-2021. The project facilitates STEM education development with self-directed learning (SDL) which aims at making use of STEM Education to foster creativity and making schools as empowering sites for self-directed learning in STEM.

We did a collaborative work among the Integrated Science, Mathematics and Computer Literacy and designed a learning module for S2. It takes the form of a real life situation and requires students to conduct scientific investigation and engineering design process. With the module “Designing a slide”, our teachers in our team won the prizes of the Teacher Award Scheme in:

- SDL-STEM Innovation School Award (SDL-STEM 創新學校發展獎)
- SDL-STEM Innovation School Award – Strategic vision and sustainable development (SDL-STEM 創新學校多層領導學習獎)
- SDL-STEM Learning Design Award (SDL-STEM 學習設計獎)



## Joint School Science Exhibition (JSSE)

Joint School Science Exhibition (JSSE) is one of the oldest and most prestigious local STEM events in Hong Kong, and we have been participating in this competition for a very long time.

Students need to work as a team to research on a daily life issue, which by means of an innovative invention using their talents from all STEM aspects, especially with the application of novel technology, to come up with creative solutions to address the issue. The product invented will be demonstrated in the JSSE exhibition being held during summer holiday each year.





# Our past JSSE projects



## 54<sup>th</sup> JSSE (2021)

Theme: Balance 平衡



Our app helps users build up a healthy lifestyle through recording daily nutritional information, either by inputting manually or scanning QR code provided on receipts from partnership restaurants. It then provides users with detailed nutritional reports regularly and tailor-made suggestions on sports and dietary suggestions to “balance their calories”, hence motivate them to correct their unhealthy diets or lifestyles.



## 53<sup>rd</sup> JSSE (2020)

Theme: Workplace 工作場所



*Synergistic Office System*



Our system checks the availability of co-workers and special rooms in offices for better in-person communication and resources management. It also fosters bonding between co-workers by helping to arrange meal gatherings and team building activities. Our system can also show selected personal particulars to co-workers nearby for easier mingling between newcomers and current staffs.

\* Due to the COVID-19 pandemic, the 53rd JSSE final round exhibition and competition was cancelled.

# Our past JSSE projects

鐵達嚟  
Teet Tat Lay

## 52nd JSSE (2019)

Theme: Journey 旅程

鐵達嚟  
Teet Tat Lay

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15



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Our product uses different sensors to estimate the rough number of passengers in each compartment of upcoming trains and their current locations in the MTR system. This information will be shown on notice boards on station platforms and our mobile app, allowing passengers to choose the least crowded compartment of a train.



Our app can also remind passengers to get off the train for interchange and their destination. It also allows passengers to share the current compartment and location of their train with friends within the MTR system for easy meet-up in a station.



## 51st JSSE (2018)

Theme: Reflection 反思

節能導  
Energide



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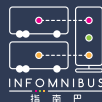
By applying the “Internet of things” concept, our app can remotely control and monitor the energy consumption of different household electrical appliances, and at the same time teaches children to adopt energy saving habits in a fun and interactive way.



# Our past JSSE projects



50th JSSE (2017)  
Theme: Community 社區



PH17 SALESIAN ENGLISH SCHOOL  
INFORMNIBUS  
Intelligent Bus System



The system estimates the number of passengers on a bus by measuring passenger weight and seat occupancy, real-time buses locations and arrival time. These information will be displayed in bus stops and our mobile app for better decision making for passengers to choose the right transport method.

This idea was covered by many newspapers and magazines. Now it is even being adopted by some local bus companies!



49th JSSE (2016)  
Theme: Connection 連繫



TREE  
SENSOR

It monitors the health status of trees in the society by using the concept of “Internet of things”, including a series of internet-connected sensors detecting temperature and humidity inside a tree to spot out potential health problems. This project earned us a chance to be interviewed by RTHK and radio broadcasted that year.





# Major awards

Year	Events	Awards
<b>Science</b>		
2016	Hong Kong STEM Olympiad 2016	Biology - High Distinction Chemistry & Physics – Credit
2016	Hong Kong Biology Olympiad for Secondary Schools	First Class Honours (x1), Merit (x2)
2017	Chemists Online "Self-study Award Scheme 2017"	Platinum award (x1), Gold award (x1)
2017	HKASME Hong Kong Biology Literacy Award 2017-18	Second Class Honours (x1), Third class honours (x1), Merit (x2)
2018	Chemists Online "Self-study Award Scheme 2018"	Diamond (x2), Platinum (x1), Silver (x1), Bronze (x1)
2019	Chemists Online "Self-study Award Scheme 2019"	Diamond (x2), Bronze (x2)
<b>Technology</b>		
2016	49 <sup>th</sup> Joint School Science Exhibition	Most popular booth, 2 <sup>nd</sup> runner up of Proposal Competition
2017	50 <sup>th</sup> Joint School Science Exhibition	Overall 1 <sup>st</sup> runner up, Most popular booth
2018	51 <sup>st</sup> Joint School Science Exhibition	Most popular booth, Best presenter
2019	52 <sup>nd</sup> Joint School Science Exhibition	Overall 1 <sup>st</sup> Runner up, Most popular booth, Best presenter, Champion of Proposal competition,
2020	53 <sup>rd</sup> Joint School Science Exhibition	2 <sup>nd</sup> runner up of Proposal Competition
2021	54 <sup>th</sup> Joint School Science Exhibition	Most popular booth, Best presenter
<b>Engineering</b>		
2016	World Robot Olympiad 2016 - Speed Challenge	Golden Lego Award, Best performance award
2016	Vibrating Robot Relay Race 2016	First prize (x8), Second prize (x9)
2016	Robotics Intelligence and Digital Media DIY 2016	Second prize
2017	Robotics Intelligence and Digital Media DIY 2017	First prize
2017	Vibrating Robot Relay Race	First prize (x8), Second prize (x10)
2017	VEX robots on Six Arts 2017	Third prize
2018	Robotics Intelligence and Digital Media DIY 2018	Second Prize



# Major awards

Year	Events	Awards
<b>Engineering</b>		
2018	World Robotics Olympiad 2018 - Speed Challenge	Golden Lego Award
2019	World Robotics Olympiad 2019 - Speed Challenge	Golden Lego Award, Best performance award
<b>Mathematics</b>		
2016	Pan-Asia Pacific International Mathematics Invitation Competition	First prize (x1), Second prize (x6), Third prize (x3)
2016	Pan-Asia Pacific International Mathematics Invitation Competition (Advanced level)	Second prize (x2), Third prize (x3)
2016	The Hong Kong Mathematics Creative Problem Solving Competition	Silver prize (x4)
2016	Hua Xia Bei National Mathematics Olympic Invitation Competition 2016 (Hong Kong District)	Third prize
2017	2016-17 The Hong Kong Mathematic Creative Problem Solving Competition	Silver award (x4)
2018	Hong Kong & Macao Mathematical Olympiad Open Contest 2017-18	Silver prize (x4), Bronze prize (x7)
2018	The Hong Kong Youth Mathematical High Achievers 2018	Third prize (x2)
2018	Hong Kong Mathematics Olympiad (HKMO)	Best Performance Certificate (x4)
2019	Greater Bay Area Mathematical Olympiad Preliminary Round 2019	First prize (x1), Second prize (x6), Third prize (x7), Merit (x3)
2019	Greater Bay Area Mathematical Olympiad Final Round 2019	First prize (x1), Second prize (x1), Third prize (x1), Merit (x1)
2019	Hua Xia Bei	First prize (x1), Second prize (x1), Third prize (x1), Merit (x2)
2019	Hong Kong Mathematics Creative Problem Solving Competition	Bronze award (x4)
2019	HKMO Open	Gold award (x1), Silver award (x4), Bronze award (x11)
2019	HKIMO	Gold award (x1)
2020	Greater Bay Area Mathematical Olympiad Preliminary Round 2020	First prize (x1), Second prize (x11), Third prize (x12)
2020	Hua Xia Bei	First prize (x1), Third prize (x6)
2020	HKIMO	Bronze award (x5)

# Study tours

## STEM study tour

With the use of the Diversified Learning Grant, we organized a study tour to Taiwan for senior form students in 2017, which allowed them to experience how STEM education in Taipei can bring insights to the city's technological and social development.



## Our young astronaut

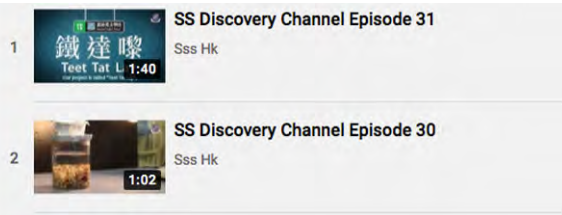
Our first “astronaut” Hoffman Tse, who was once selected to be the representatives of Hong Kong in the Young Astronaut Training Camp, continued to pursuit his dream in the realm of astronomy, he was enrolled to the study tour to Beijing and Xi'an in 2017 and had learned a lot during the trip.



# More discoveries ahead...

## SS Discovery Channel

To further promote self-directed learning, our science teachers also regularly prepared video clips on introducing interesting science concepts. Please scan the QR code on the right or visit our school website for more details.



## Alumni sharing

Without the effort from Salesian English School science teachers on arousing my curiosity on Physics, I would not have the opportunity to stand nearby CMS (Compact Muon Solenoid), the most profound and precise detector in human history at CERN.

*Kyle Ho Chun LAU (2016 graduate)*



I think the science teacher from Salesian English School did pay a lot of attention to constructing a better atmosphere in learning science. They often bring us insights on applying scientific knowledge in a daily life setting. Their teaching had facilitated me to build up my interest in the field of food science and nutrition, which is a discipline that focuses on the application of science.

*Nelson Chi Yin WONG (2019 graduate)*

Science



Engineering



Technology



$$\int \frac{x^2}{2} dx$$

Mathematics



Want to know more about us? Just visit our school's website at the back for the latest news in our school's STEM education development. We are also going to have our 70th anniversary open day in late 2021. Stay tuned!

Acknowledgements:

STEM Team  
Gifted Education Team  
Biology, Chemistry, Information & Communication Technology,  
Integrated Science, Mathematics, Physics and Visual Arts Panel,  
Robotics Club and Robotics Team, Programming Design Club,  
Academic Affairs Committee, JSSE Sub-committee,  
Multimedia Production Team

Salesian English School  
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