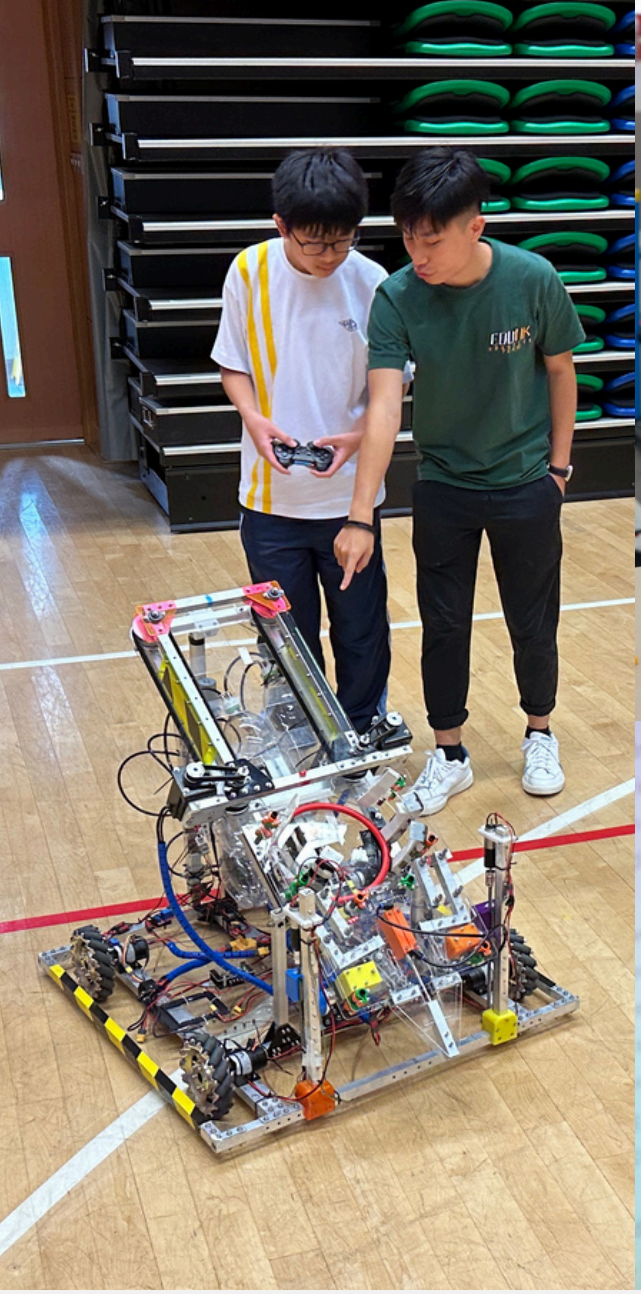
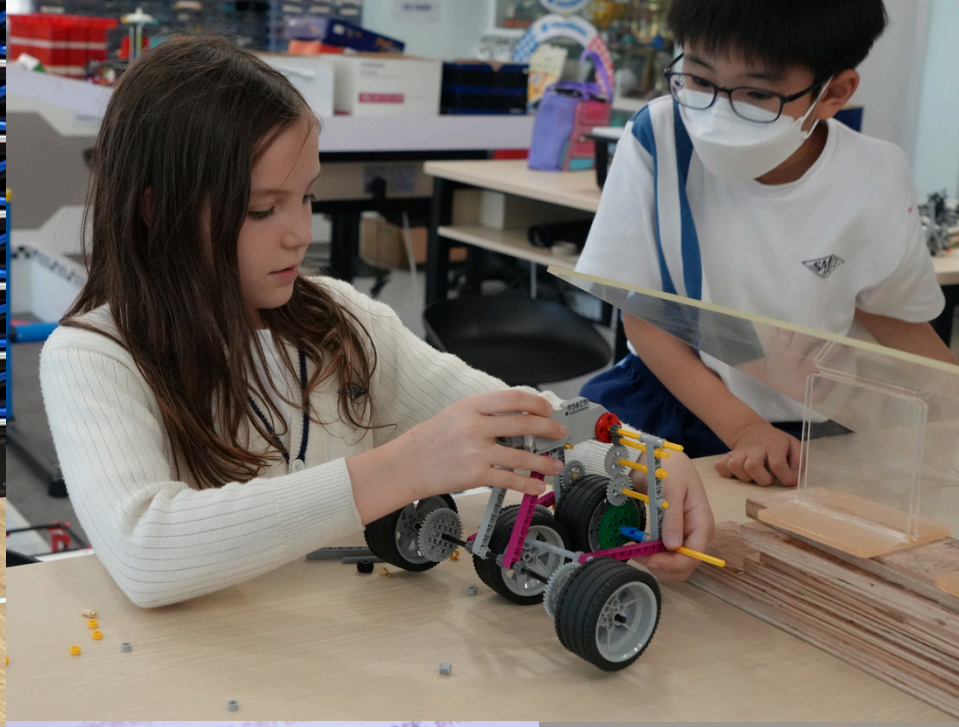








STEAM MAGAZINE

P3 / P4 LITTLE EXPLORER **05**
Engineering everywhere all at once

S3 STEAM LESSON **11**
From conception to completion

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Snaps from various STEAM activities

St. Margaret's Co-Educational English Secondary and Primary School

2023-2024 | Issue #3

PREFACE

In recent years, the world has witnessed the rise of STEAM education - the integration of Science, Technology, Engineering, Arts, and Mathematics. This multidisciplinary framework has gained global recognition as a means to foster the development of essential skills for the next generation of our workforce. We are proud to showcase the remarkable strides our school has made in implementing STEAM lessons, activities, as well as participating in local and international STEAM competitions.

Our school has refined the existing STEAM curriculum, tailoring it to the unique needs of students from Primary 3 to Secondary 3. The incorporation of self-directed learning and the engineering design process within lessons enables students to develop their creativity and problem-solving skills. Our Secondary 3 STEAM curriculum has even earned acclaim from prestigious universities such as the University of Hong Kong.

To complement our classroom-based STEAM initiatives, we have also curated a diverse array of STEAM activities. From hands-on workshops to collaborative projects, these opportunities have further empowered our students to strengthen vital 21st-century proficiencies such as communication, teamwork, and digital literacy.

One of the most remarkable achievements featured in this magazine is our students' performance in various STEAM competitions, such as the CTEA Cup Robotic Tournament Creative Technology Robotic Competition, Vex IQ Robotics Competition, and the Student of the Year Hackathon, to name a few. The innovation, cooperation, and perseverance demonstrated by our students has earned them numerous awards, most notably the Champion title in the Odyssey of the Mind Hong Kong Regional Tournament, entitling them to participate in the world championship.

As you flip through the virtual pages of this publication, you will witness the dedication, passion, and ingenuity of our students and educators. Their stories serve as a testament to the transformative power of STEAM education, inspiring us to continue pushing the boundaries of what is possible.



MR. PAPA MARCUS NATHANIEL MENDOZA
MATH, ICT, AND STEAM TEACHER
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SHOCKING DISCOVERIES
P1 / P2 STEAM LESSONS



Chock full of fun and interesting activities such as optical illusions and chromatography, the P1 / P2 STEAM curriculum serves as students' first exposure to vital science concepts. In this lesson, students were learning about the concept of electricity and how it flows to power different everyday objects. They had great fun using various materials to create actual working circuits.

Perhaps my favourite part of teaching this class is their curiosity. While things like electric currents may seem mundane to adults and teenagers, these kids are truly fascinated with almost anything they see. Their childlike wonder and amazement always makes my day.

BY MR. MICKE-DONGO
P1 / P2 STEAM TEACHER
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PICTURED:
Mr. Micke Dongo and his students creating circuits







STORY BUILDING WITH LEGO

P3 / P4 STEAM LESSONS

The P3 / P4 STEAM curriculum is quite diverse in its coverage. Here, students learn about the working principle of periscopes and ray diagrams, holograms, as well as forensic science and storytelling. Because of this, no two lessons are the same which the students really enjoy!

The forensic science module is personally, one of my favourite topics in this curriculum. In this lesson, students learn about how crime-scene investigators are able to track people's movements using a variety of evidence types, such as biological evidence (blood, hair, etc.) and latent print evidence (fingerprints, palm prints, etc.). Students are then taught how to lift shoe prints by pouring a material onto the surface containing the shoe print. This eventually hardens, capturing the shape of the surface containing the shoe print. As forensic science is not often discussed, students were captivated during the entire lesson and were ecstatic when they successfully applied the technique.

"OUR STUDENTS' OUT-OF-THE-BOX THINKING CONTINUES TO INSPIRE ME"

One of my most treasured moments is the Lego storytelling module, which is what you are looking at in the pictures. While many students have experience with Lego for engineering purposes such as creating mechanisms or machinery, rarely do students get in touch with their artistic side when playing with Lego. In this lesson, students use Lego to create characters and props, which they then use to share stories with each other, fostering creativity in a different way.

While initially, the students were confused as they never thought to use Lego this way, they eventually persevered and were able to showcase a variety of stories with their characters, from bittersweet to heartwarming. It fills me with joy to know that our students can so elegantly integrate knowledge from other subjects such as creative writing and performing arts into a production that was completed within a lesson-long timeframe. Our students' out-of-the-box thinking continues to inspire me to try novel and unorthodox approaches in lessons.

BY MR. HUI YIK ON
P3 / P4 STEAM TEACHER
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PICTURED:
P3 and P4 students with their Lego characters and props

ENGINEERING EVERYWHERE ALL AT ONCE

P3 / P4 ADVANCED LITTLE EXPLORER

"FREE REIGN TO RESEARCH AND TRY DIFFERENT SOLUTIONS"

The Advanced Little Explorer class for P3 and P4 is an elective subject that goes significantly deeper than the standard STEAM lessons. Not only does this subject last for the whole academic year rather than just 4 weeks, but each new module has students solve a different engineering challenge in groups, be it earthquake-resistant buildings to paper bridges that are capable of carrying several kilos of weight. This is engineering on a whole other level.



PICTURED:
A P3 student testing a Lego car

PICTURED:
Left: Mr. Papa and his students testing the torque of a Lego car
Top Right: P4 students with their prototype vehicle
Middle Right: Prototype gear train created by a P3 student
Bottom Right: Test vehicle with suspension, steering, and extremely low gearing



As someone with a mechanical engineering background, teaching this class is both exciting and rewarding in a way that my other classes can't quite replicate. One of my favorite things to do as a kid was explore purely for the sake of discovery and fun, and I am grateful that I get to provide the same experience for these students.

What makes this class so enjoyable is that there is no graded academic component, and that the timetable is extremely flexible. What that means for students is that when a new engineering challenge is assigned, they have nearly completely free reign to research and try different solutions on their own time. If they complete the challenge within the allotted lessons, then that's great. But if not, then succeeding topics will simply be pushed back until the challenge is done.

If there's anything I'd like my students to take away from STEAM lessons, it's that failure is expected. Like engineering, learning is an iterative process where failures should be treated not as incompetence, but as stepping stones. As Stephen McCranie put it, "The master has failed more times than the beginner has even tried".

BY MR. PAPA MARCUS NATHANIEL MENDOZA
P3 / P4 ADVANCED LITTLE EXPLORER TEACHER
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MAKING MASTERPIECES AND MEMORIES

S1 / S2 JUNIOR ENGINEER



PICTURED:
Students testing a catapult

PICTURED:
Top: Students testing out another catapult design
Bottom left: Students discussing the working mechanism of one design
Bottom right: Students pitting their catapult designs against each other







S1 and S2 Junior Engineer is really more for exploration and friendly competition than anything else. While the content itself isn't that challenging to understand, these lessons are designed foster teamwork skills and to excite students' competitive spirit.

In this lesson, students built catapults which they then used to shoot rubber balls at a target board. They had a lot of fun comparing designs and seeing who can shoot the most accurately. I thoroughly enjoyed watching students work together as a team and joke around with each other.

BY MR. HUI YIK ON
S1 / S2 JUNIOR ENGINEER TEACHER
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The S2 curriculum beautifully integrates chemistry, biology, and physics into a class brimming with mesmerizing demonstrations and unforgettable activities.

PICTURED:
The creation of coffee caviar by placing hot coffee droplets into a gelatin mix

SCIENTIFIC SPECTACLES
S2 STEAM LESSONS

PICTURED:
Students enjoying the coffee caviar creation activity





In this activity, students made coffee caviar by pouring hot coffee into a mixture containing gelatin. During the activity, the aroma of freshly brewed coffee filled the room, creating an inviting atmosphere. And as the coffee and gelatin mixture began to set, the students watched in anticipation, eager to see the transformation. While it was not an easy technique to master, seeing students getting so caught up and engaged in a science activity was extremely rewarding for me.

This simple yet engaging task not only taught them about the science of molecular gastronomy, but also about a special cooking technique which is not often seen in traditional restaurants.

BY MR. CHUNG WAI MAN
S2 STEAM TEACHER
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This activity is one of my most memorable as it involves ingenuity as well as friendly competition between groups. The objective is simple: design an obstacle course for a marble such that it can fall from the top of a box to the bottom in the longest amount of time.

It was fascinating to see the different ways students used to create as many sources of energy loss as possible. One unforgettable moment was when one group demonstrated literal out-of-the-box thinking and created a longer path outside of the box to remove even more energy from the marble as it got closer to the bottom.

BY MS. TAM PUI SAN ALISON
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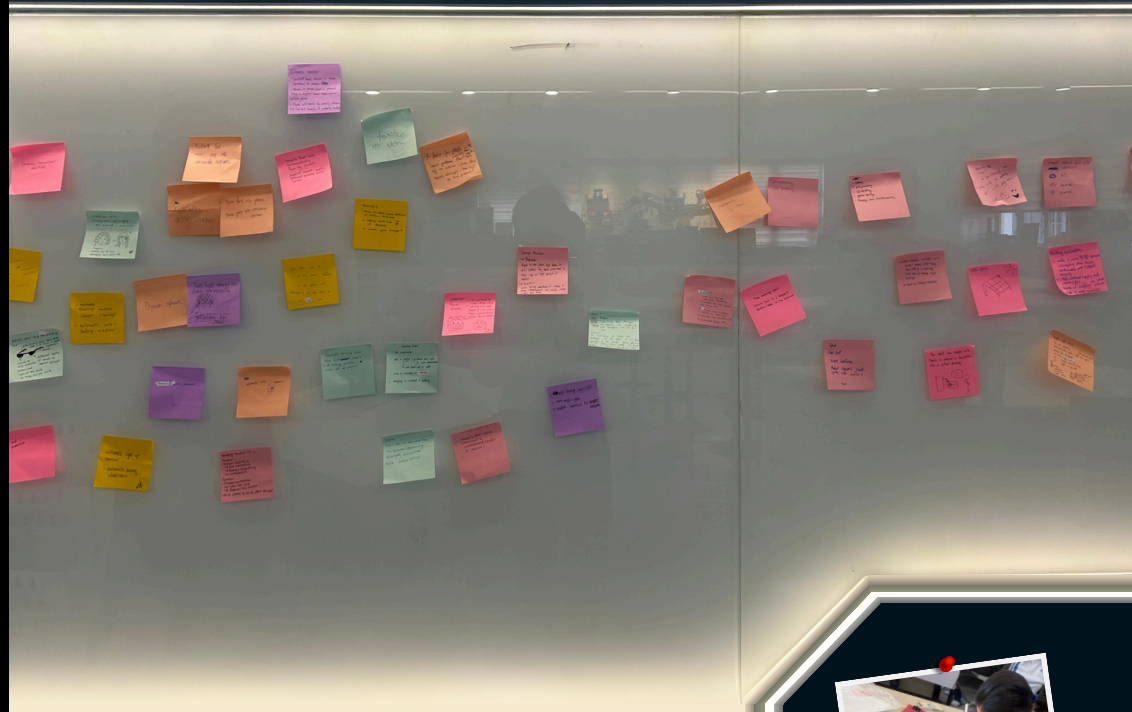




PICTURED:
Students testing their marble obstacle courses

FROM CONCEPTION TO COMPLETION

S3 STEAM LESSONS



In S3, students face their toughest challenge yet: managing an entire project from start to finish. In this class, students are introduced to various world problems where they need to choose a problem to address. They then come up with a potential tool/product/app to solve this problem using knowledge gained in previous STEAM lessons.

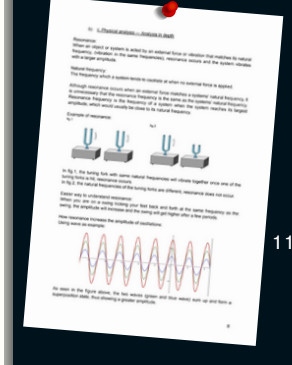
Similar to how engineering projects are done, students participate in an year-long design process. Not only must students create an actual working prototype of their idea, they also complete a project proposal with comprehensive literature reviews on existing solutions, and a logbook detailing the conception and refinement of the product itself.

While this is arguably a more daunting task than the ones found in other lessons, the rise of STEAM-related careers mean that proper communication of ideas is essential in today's job market. Students gaining experience with project management at an early age will give them a significant advantage in their future careers.

BY MR. HUI YIK ON
S3 STEAM TEACHER
hyo@smcesps.edu.hk

PICTURED:
Top: Students' brainstorming board showcasing potential solutions to existing problems
Top Right: S3 students creating their prototype
Bottom Right: A logbook detailing S3' students project design process





"DESPITE THE WORKLOAD, OUR STEAM TEACHERS WERE A BIG HELP AND GUIDED US THROUGH EVERY STEP OF THE DESIGN PROCESS"



A few S3 students in particular took their projects to the next level. They participated in the HKU CITE Student Award Scheme 2023-2024. This competition aims to foster students' development in skills related to the engineering design process as well as 21st-century abilities such as cooperation and communication.



These students presented their projects in front of a host of people including judges and other students. At the end, they managed to win a number of awards, such as the Star of Self-directed Learning in STEAM - Champion award, the Most Voted Star of Self-Directed Learning in STEAM award, the Most Liked Booth award, and the Most Voted Video award among others. Our school also earned the School Development award (Secondary Division) and the Learning Design award (Secondary School Division).

One student highlighted that a significant contributor to their success was the effort of their STEAM teachers. "There was a lot of work to do as it was a year-long project. Aside from the product itself, we spent a lot of time on the logbook as every detail of the product's development needs to be described, which was a bit overwhelming at first" she says. "Despite the workload, our STEAM teachers were a big help and guided us through every step of the design process. Looking back, the workload wasn't as demanding as I originally thought".

PICTURED:
Top: Mr. Hui Yik On (left), Dr. Lam Chun Kit (center), and Ms. Tse Hoi Ming (right) with project awardees
Bottom: Project awardees presenting their solution to other students

#COMPETITIONCAPTURES

ODYSSEY OF THE MIND HONG KONG REGIONAL TOURNAMENT (PRIMARY)



The Odyssey of the Mind (OM) competition is a creative problem-solving program where students are tasked to find solutions to long-term problems and present them through theatrical performances. It fosters various skills such as teamwork, time management, and public speaking.

Featured in these photos is our primary OM team who took home the Champion trophy thanks to their creativity and ingenuity.

PICTURED:
Top: Mr. Hui Yik On (left), Ms. Yuen Ming Ting Brenda (center), Ms. Fong Wai Chun (right) and the primary OM team with their Champion trophy
Bottom: Students performing their act

#COMPETITIONCAPTURES

ODYSSEY OF THE MIND HONG KONG REGIONAL TOURNAMENT (SECONDARY)





Our secondary team also participated in the OM competition. Despite facing great challenge from other competitors, with sheer determination, they managed to bring home the 2nd runner-up award.



PICTURED:
Top: The secondary OM team
Bottom Left: Students performing their act
Bottom Right: The primary and secondary OM team and OM teachers

#COMPETITIONCAPTURES

VEX IQ ROBOTICS COMPETITION



The VEX IQ Robotics Competition is a game-based engineering challenge where participants design and build a robot to score as many points as possible in a game. What makes this series of competitions so arduous is that the game rules and objectives change every year, meaning that new participants essentially have to create a new design from scratch. Not only that, but similar to S3 STEAM lessons, a comprehensive engineering logbook must be created to document the robot's development and testing.

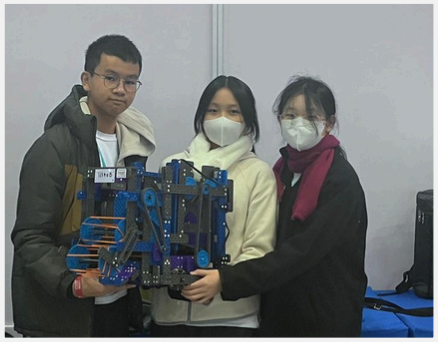
Featured in the photos is our VEX IQ team and teacher advisors who have managed to bring home the Judges Award, the Create Award, and the Strategy Award. Our dedicated team of students and teacher advisors have worked tirelessly to perform well in this competition. There were even a few times where the team stayed late at night to prepare for the events. These awards would not have been possible without the commitment and perseverance shown by our students and teacher advisors.

PICTURED:
Top: The VEX IQ team receiving their awards
Bottom Left: Mr. Hui Yik On and the VEX IQ team
Bottom Center: Mr. Papa and Mr. Hui Yik On with the VEX IQ team late at night
Bottom Right: The VEX IQ team discussing their robot's programming

#COMPETITIONCAPTURES

VEX INTERNATIONAL OPEN

PICTURED:
Top Left: The VEX team with their robot
Bottom Left: Mr. Shiu Ultan and the VEX team enjoying a meal together
Right: The VEX team and Mr. Shiu Ultan at the International Open competition







Can you imagine spending New Years' away from your own family? Well, that's exactly what some of our VEX team members had to do this academic year.

In December 2023, we were invited to join the VEX International Open competition which attracts talents from all over the world to test their engineering and project management skills. This year, it was held in Wuxi over the Christmas holiday. Three VEX team members along with one of the teacher advisors, Mr. Shiu Ultan, embarked on this long journey together to experience one of the largest robotics competitions in the world.

It is touching to witness their passion to do what they love no matter what.

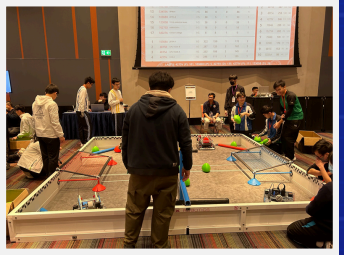
#COMPETITIONCAPTURES

VEX V5 ROBOTICS COMPETITION

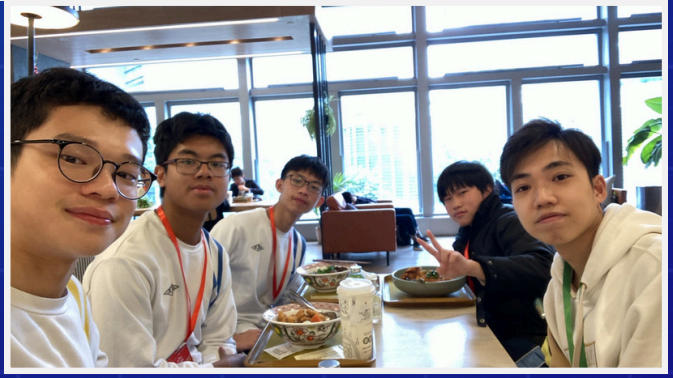


VEX V5, similar to VEX IQ, tasks participants to develop a robot to play a game with a certain objective. However, V5 robots are made of metal which require more advanced fabrication and assembly methods. V5 robots are also compatible with a vast array of additional parts beyond those available for IQ such as pneumatics which open new doors for feasible designs.

Our VEX V5 team participated in the VEX V5 Robotics Competition and thanks to their passion and hard work, earned a place in the finale.



PICTURED:
Top Left: The VEX V5 team with their robot
Top Right: The game area at the venue
Bottom Right: Mr. Hui Yik On and the VEX team enjoying a meal together



#COMPETITIONCAPTURES

STUDENT OF THE YEAR HACKATHON



PICTURED: S4 and S5 students presenting their project ideas in front of judges

The Student of the Year Awards is an annual event held by South China Morning Post that celebrates the achievements and community contributions of senior secondary students. The Student of the Year Hackathon is a new competition held for the first time this year and previous Student of the Year winners are eligible to participate.

The goal is simple: develop a digital solution to a real-world problem. A team of 2 S4 and 2 S5 students worked together to create an online platform where students can access and share educational resources such as notes and tutorial videos with each other. To incentivize students to contribute, a token-based system will be implemented. Gaining additional tokens grants users greater access to resources, facilitating two-way exchange.

The potential benefits of this project towards students' social and academic development has earned this team a spot in the finale.



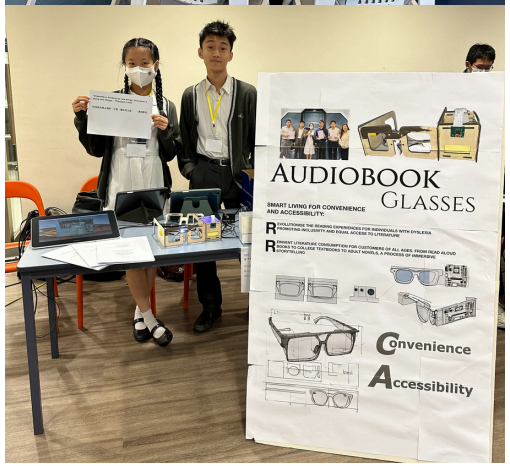
PICTURED: Participants of the Student of the Year Hackathon

#COMPETITIONCAPTURES

THE 17TH CTEA CUP ROBOTIC TOURNAMENT CREATIVE TECHNOLOGY ROBOTIC COMPETITION

Two teams, one primary (P6 students) and one secondary (S4 students), entered this competition. Secondary student participants are tasked to create an innovative product and present a fully working prototype at the competition venue. The quality work created by our students earned them the Best Model Award.





PICTURED:
Top: The secondary CTEA team presenting to STEAM teachers
Bottom: The secondary CTEA team's booth at the competition venue

PICTURED:
Top: The primary CTEA team and teacher advisor, Mr. Wu Tsz Wo
Bottom: The primary CTEA team programming their robot



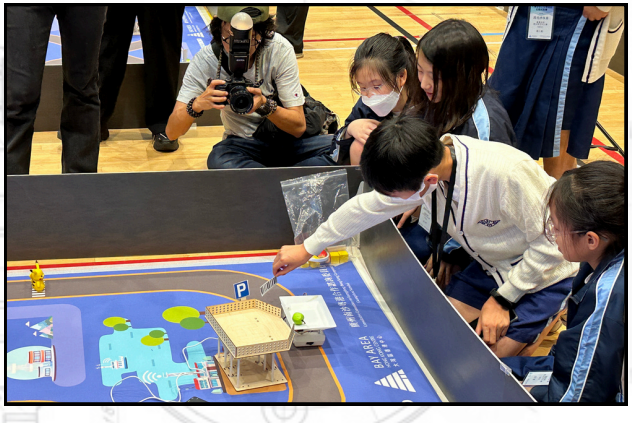


For the primary competition, participants use various mechanical kits or self-made materials to construct a robot chassis. They will then pair it with their chosen controllers and application software to demonstrate their creativity and design, enabling the machines to perform the required movements or tasks for the competition. The primary team's great efforts netted them the 3rd Runner-Up award.

#COMPETITIONCAPTURES

GBA SMART TRANSPORTATION INTER-SCHOOL CHALLENGE





In this competition, participants will use their programming, innovation, technological, and collaborative abilities to remotely control an AI smart logistics vehicle and a drone. Students are to complete a series of tasks within the allotted time to earn points and win the competition.

The team consisting of a mix of primary and secondary students thoroughly enjoyed the competition and gained valuable insight into the mechanisms behind smart transportation systems and smart cities.

PICTURED:
Top: Mr. Lin Cunxiu (left), Mr. Chung Wai Man (right) and the participants on stage
Bottom: Students testing out their robot's programming

#COMPETITIONCAPTURES

FIRST LEGO LEAGUE EXPLORE



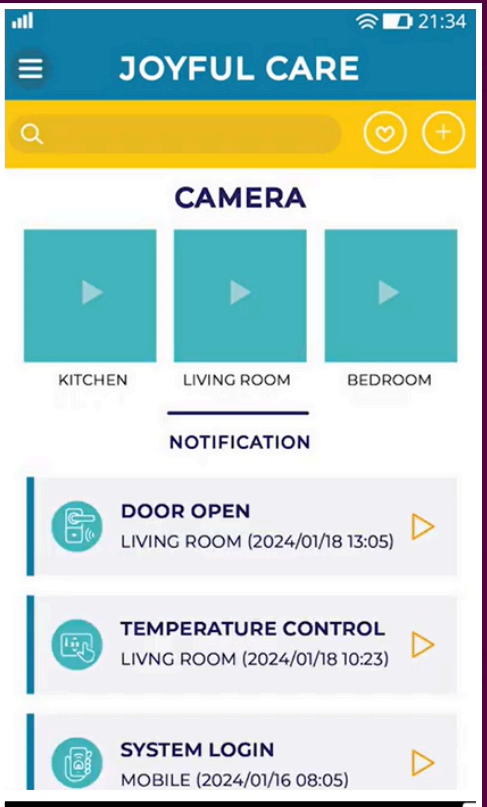
In this competition, students are encouraged to unleash their boundless imagination and creativity to explore how to integrate artistic and STEM elements. They will reinterpret the possibilities of art through the use of light, sound, and various technological media by recreating performances using Lego. The hard work from our Lego league team and teacher advisors have culminated in the team receiving the Challenge Solution award.

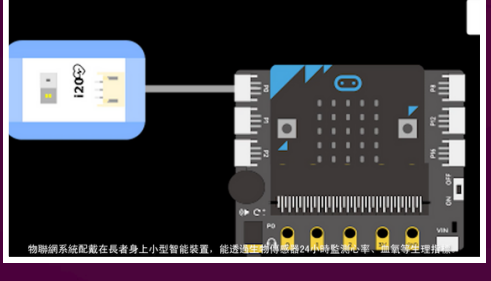


PICTURED:
Top: Mr. Lin Cunxiu (left), Mr. Hui Yik On (center left), Ms. Yuen Ming Ting Brenda (center right), and Ms. Chan Wing Ching with the participants
Bottom: Students' Lego creation

#COMPETITIONCAPTURES

HONG KONG SCIENCE FAIR





PICTURED:
Top: The application's main interface
Bottom: IOT mechanism of this project

The Hong Kong Science Fair is a competition held by the Hong Kong Innovation Foundation to provide a platform where students can present their innovative solutions to various community challenges such as disease prevention, climate change, and many more.

Our Science Fair team decided to tackle the aging population problem by creating a platform to more easily monitor elderly people living alone. The platform uses a combination of IOT devices and an app to display information and updates about the elderly person's actions such as if they change the temperature of their air conditioner or if they open a door. The app will also warn the user if the IOT devices detect that the elderly person is in need of urgent assistance, and will flash an "Emergency" message to alert the user to come to the elderly person's aid.

This app aims to improve the elderly's quality of life by facilitating better communication between all family members. It also aims to enhance security to provide peace of mind.



1ST CROSS-CURRICULAR ACTIVITY DAY

Several innovative startup companies were invited to give talks to inspire our students.

#STEAMSTILLS



2ND CROSS-CURRICULAR ACTIVITY DAY

S4 and S5 students visited the Faculty of Engineering at the Hong Kong University of Science and Technology, where they learned about cutting edge technological research and participated in many hands-on activities.



Mr. Wu Tsz Wo (left), Mr. Lin Cunxiu (center), and Dr. Lam Chun Kit (right) with student participants



A student presenting a piece of laser-engraved wood



A student presenting the VEX IQ robot



#STEAMSTILLS



INNOGALA

The school robotics team showcased our achievements in STEAM Education in the 2023 Innogala organized by the Hong Kong Direct Subsidy Scheme Schools Council.

Students presenting the VEX IQ robot to judges



Mr. Hui Yik On (left), Mr. Lin Cunxiu (center), and Mr. Wu Tsz Wo (right) with student participants at their booth



Primary students playing a circuit building game



Students building a Leonardo Bridge



A primary student making art using polygons



Primary students solving shape puzzles

#STEAMSTILLS

STEAM WEEK

"STEAM Week" was held from February 26 to March 1 2024. With cooperation from the Mathematics, Science and Technology Education departments, a diverse range of STEAM related booth games and workshops were held throughout the week for all students to enjoy. Students learned various STEAM-related skills and knowledge, such as pH paper drawing, electric circuit building, VEX IQ Robot Workshops, and VR experiences.



A secondary student playing a game at the Math Exhibition



A primary student painting pH paper

#STEAMSTILLS

S1 students generating ideas for their project



P6 students presenting their solution



Singapore STEAM Study Tour

Several P6 to S2 students along with 4 STEAM teachers ventured to Singapore to learn about their creative approaches to environmental protection and sustainability.

Under the guidance of Nanyang Technological University, they discovered and practiced new ways of collaborative idea generation and knowledge building to solve a chosen world problem. They then presented their solutions and thought processes in a mini-conference with students from Singapore.

Students at Universal Studios Singapore



Students at Gardens by the Bay



However, this was not only an academic visit, but a cultural one. They went on to enjoy a variety of Singapore's most iconic destinations, such as the Gardens by the Bay, the Marina Bay Sands SkyPark, and even Universal Studios Singapore. Many also indulged in Singapore's delectable cuisine like kaya toast, laksa and nasi lemak.

AFTERWORD

As you reach the final pages of this captivating publication, we hope you have thoroughly enjoyed exploring the remarkable STEAM initiatives and achievements of our school community. The stories and photographs within these pages serve as a testament to the transformative power of this multidisciplinary approach to education.

Looking ahead, we are committed to further refining our school-based STEAM curriculum to ensure it remains at the forefront of educational innovation. In the coming year, we will introduce new STEAM lessons tailored specifically for our Primary 1 to 5 students, in line with the newly-developing primary science curriculum. This evolution will empower our younger learners to develop a robust foundation in STEAM principles and foster their innate curiosity.

Moreover, we will continue to enhance our STEAM lessons by integrating even more 21st-century abilities, such as scientific investigation and the application of artificial intelligence. By equipping our students with these vital skills, we are preparing them to thrive in an increasingly complex and technology-driven world.

In addition, students will be further encouraged to participate in a diverse array of local and international STEAM competitions. These exciting events not only challenge our young minds but also provide invaluable opportunities for them to showcase their creativity, problem-solving prowess, and collaborative spirit.

As we look towards the future, we would like to extend our heartfelt gratitude to the various stakeholders who have supported our STEAM Education. To our school management, teachers, parents, and, most importantly, our students – your unwavering dedication and enthusiasm have been the driving force behind our successes. Together, we will continue to push the boundaries of what is possible in STEAM education, inspiring generations to come.



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