



**SINGAPORE  
INTERNATIONAL  
SCHOOL**

# STEM



Science • Technology • Engineering • Math

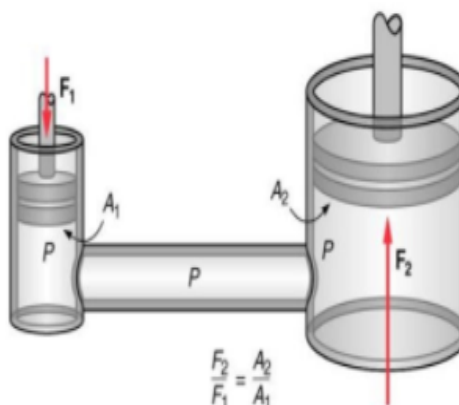
# NEWSLETTER

**Dear Parents,**

Welcome to our SIS@Halong STEM Newsletter. In this newsletter we showcase highlights of our students' involvement in Science, Technology, Engineering and Mathematics (the STEM subjects)- and this helps our students develop knowledge and skills needed for the future. Bearing in mind that many jobs in the future will be STEM-related, SIS@HL's STEM curriculum is future focused, and the approach teachers here use in the classrooms involves students in hands-on problem solving activities that build creative and thinking skills, problem solving skills as well as design and evaluation concepts. We hope you enjoy the highlights of their achievements and accomplishments during this Semester in the pages ahead.

## INVESTIGATING FORCES, HYDRAULICS AND PRESSURE

Our investigation into Stem Basics at the beginning of the year on building materials and construction methods provided an interesting context for Secondary students to develop their understanding of basic ideas relating to forces, energy transfer and properties of materials. Year 8 students spent a few weeks investigating forces, pressure, hydraulic systems and Pascal's Law. They learnt that a small force applied to a piston with a small area produces a much larger force on the larger piston. This allows a hydraulic jacks, brakes, lifts, elevators, to lift heavy objects with a small force.



Above: Students in Grade 8 designed and constructed projects applying Pascal's Law and constructed raised platforms, lifts, and water fountains as part of their STEM lessons in school.



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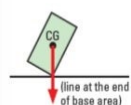
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*Tower building is a fun and integral part of STEM which taps on students prior knowledge of use of materials and concepts in Science such as stability and the centre of gravity.. Each engineering challenge gives students something new to solve and more than likely, it is a challenge they have never tried before. STEM engineering challenges give students a safe place to experience failure and to learn from attempts that don't work. When their first prototype doesn't work, they just create a new one, and they learn that it is ok to not succeed on your first attempt.*

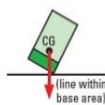


## CONDITION FOR STABILITY

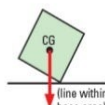
- To make a body more stable
  - Lower its centre of gravity
  - Increase the area of its base



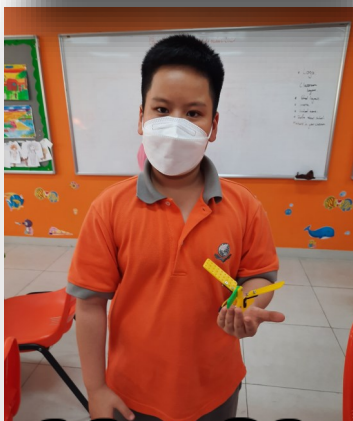
This box is at the point of tipping over



A heavy base (green area) lowers the center of gravity so the box does not tip over



A broader base makes the box more difficult to tip over



# CONSTRUCTION AND ENGINEERING





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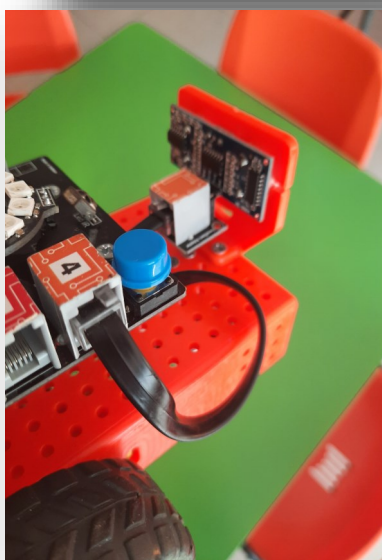
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# ROBOTICS

Robotics is a multidisciplinary field which brings together a number of distinct branches of engineering—including mechanical, electronic, computer, and systems engineering—to support a vast number of industries. Our Robotics component of STEM education in SIS@HL, provides students learning STEM skills with immediate and individualized feedback. Programming and building the robot offers students a hands-on approach to their project, allowing them to fully understand how both hardware and software work together.

This year, SIS students had the opportunity to learn about coding, and were introduced to a number of components, wheels and axles, sensors, etc, and built their own robotics models. After designing their prototype, students use the various components and construct their models. They have close to 30 brick types and also 30 types of sensors to choose from, to incorporate into their models., if they want to do so. They then test their model robots, to check if they can follow commands and coding. The fine-tuning stage follows, where students make improvements on their original designs.

The software that our students use for this is MIT's "Scratch" drag and drop platform. Students begin with basic commands and then gradually move on to more complex commands and code. In this way we hope to gradually equip them with IT Robotics skills for the 21st Century. Programming and building the robot offers students a hands-on approach to their project, allowing them to fully understand how both hardware and software work together.



# YOUNG ROBOTICS ENGINEERS





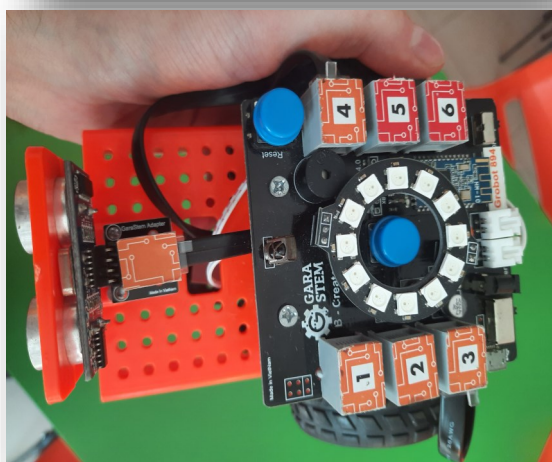
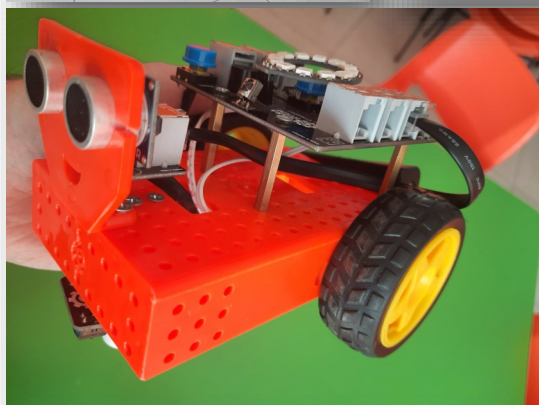
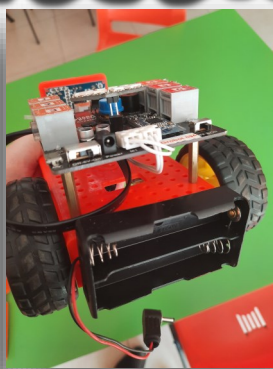
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## YOUNG ROBOTICS ENGINEERS



Our students seen here engaging in various aspects of design, coding and testing their robots. According to research, it is projected that the number of jobs available for robotic engineers (one of the most popular careers in the engineering field) will have grown by 9% by 2026.





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## FUN WITH ROCKET SCIENCE

### Racing Rockets Activity Card

You've seen a poster on the noticeboard in town:

Director Windy Astralbody told us, "It's a tall order but we hope competitors will set their sights high and maybe even break some records. We are looking for really creative ideas. Who knows, one day the winners might get to fly into space in a real rocket."

**A NEW ROCKET  
COMPETITION IS BEING  
LAUNCHED TODAY BY  
THE SPACE RESEARCH  
ASSOCIATION, 'RACING  
ROCKETS'.**



**The competition invites  
children to design and fly  
a rocket.**

#### Your challenge

Can you design a rocket that will go the furthest? Building a proper rocket is difficult but you could investigate rocket shapes that might look something like this.



### INVESTIGATING FORCES,



### HYDRAULICS AND PRESSURE



### FLIGHT & AERODYNAMICS

Teamwork and collaboration are essential parts of the STEM programme in school. Students learn to compromise, share tasks, and work together in order to meet the challenge with the designated time and material constraints. They quickly learn that if they do not work together, they will not finish their challenge in time. Having a completed project is a great motivation! Here we see primary school students having a go at Hydraulic rockets, testing their initial designs, making adjustments and finally competing against each other to see whose rocket can be launched highest in the air. The activity is part of the superstar awards in the CREST Awards programme organized by the British Science Association.



**SUPERSTAR**



# SIS@HALONG GALLERY

