

# Student Science Competitions Focus On Testing And Certification

Reliable testing and certification (T&C) plays an essential part in many aspects of our daily life. In particular, it helps safeguard consumer interests and improve the overall quality of different products and services. With this in mind, two recent competitions for secondary students in Hong Kong focused on the development of innovative, cost-effective and eco-friendly testing solutions. It was a chance for students to show their creativity on top of their critical thinking and problem-solving skills. It also cultivated in them a better understanding of why science-based testing is seen as increasingly important.



## HKCTC Special Award

The "HKCTC Special Award for Outstanding Project in Testing" (Special Award), co-organised by the Hong Kong New Cultural Generation Association and the Hong Kong Council for Testing and Certification (HKCTC), was part of the Hong Kong Youth Science and Technology Innovation Competition since 2016-17. Marking its 20th anniversary this year, the contest is one of the biggest of its kind in Hong Kong and featured a wide range of categories.

Students were asked to submit original research projects or inventions under the heading of either mathematics, physics, and engineering; chemistry and materials; biology and health; energy and environmental science; or computer science and information technology. Nine finalist teams with projects related to testing were chosen to compete for the Special Award on the day of final judging. The finalists showcased their testing solutions with the help of devices and prototypes at their booths. The judges visited each booth, listened to the finalists' presentations and posed thought-provoking questions.



(From left) HKCTC Members Dr Li Hung-wing, Stephanie Lam, Agnes Nardi, Professor Ho Kin-chung and Dr Crystal Fok formed the judging panel for the "HKCTC Special Award for Outstanding Project in Testing".

The judging panel for the Special Award was made up of five HKCTC Members.

One of the judges, Professor Ho Kin-chung, was impressed by technical proficiency and innovation of the entries.

"This award showed participating students how testing is needed in various aspects of our life and the importance of upholding stringent standards to maintain quality." He suggested that schools should introduce more testing experiments and innovation in science lessons and encourage students to look at testing and certification in a new light."

Fellow judge Stephanie Lam shared that the testing and certification sector used to have a low profile in Hong Kong, but this is no longer the case. "Local universities have started offering testing and certification related programmes in recent years," Lam said. "We need to raise young people's interest and awareness of T&C, so they will consider careers in the sector."

The champion prize went to the Chinese Foundation Secondary School's "biosensor for detecting urea in sweat". First runner-up was Pak Kau College for its "iKidney" project. And second runner-up was awarded to Kwun Tong Kung Lok Government Secondary School's "concentration detector".

The winning team developed a biosensor that used nanotechnology to help monitoring kidney function. Professor Ho noted that they had conducted numerous experiments and carried out meticulous data comparisons in developing their prototype, making it small enough to be a wearable gadget.

"We used advanced laboratory equipment and acquired testing-related knowledge, in particular about urea testing," said the team. "We hope that our deliverable can help those in need because the existing blood or urine tests are time-consuming as the test procedures have to be carried out in laboratories or hospitals."

The team envisioned that biotechnology, nanotechnology and biosensors would undergo further fast-moving development and bring new health benefits to the society.



The Special Award winners from the Chinese Foundation Secondary School: Leung Lap Sun, Tang Ping Lam and Chow Lok Chun



First runners-up from Pak Kau College: Ma Chi Chi, Mark Chun Hei and Lee Chun Lam

The first runner-up team's "iKidney" project featured a low-cost home-based health-monitoring platform. The team designed a mobile app which allows users to keep track of their kidneys function by measuring the volume, pH and color of their urine samples collected. Medical advice will also be given after the urine examination. The judges were especially impressed by the set-up in testing urine samples. The team explained that they had performed countless experiments to obtain accurate data and learned to pay closer attention to minute details when measuring pH values and monitoring color changes.

The "concentration detector" of the second runner-up team used simple equipment for testing application and built a reasonably priced alternative to the costly colorimeter. They made use of Arduino UNO to control and emit light of different colors, which will pass through a colored solution with a particular concentration. Light of particular color will be absorbed by the colored solution. By analysing the amount of light of a particular color absorbed upon passing through a

solution with the use of a light dependent resistor, they could work out the concentration in the solution. They also revealed that they had spent two months to learn coding in order to write their own programme with Arduino.



Second runners-up from Kwun Tong Kung Lok Government Secondary School: Law Ling Wa and Wu Hong Ting

## Video Contest

The HKCTC also co-organised the "Digi-Science" Video Production Competition for Hong Kong Secondary Schools 2017-18. Collaborating with the Hong Kong Association for Science and Mathematics Education, the goal of the competition was to inspire greater interest among students in learning and applying testing science.

Taking the topic "testing science for improving quality of life", the contest encouraged students to produce a two-minute video depicting innovative testing experiments. The aim was to use conventional products or materials which can be easily obtained at home or school to solve problems encountered in their daily life. The winner of the junior division was CCC Yenching College for their video entitled "Fast Testing for Caffeine in Tea". Top prize in the senior division went to St Paul's Convent School for their "Simple Tests for Metal Ions in Water Samples".



One of the judges, Dr Raymond Yung Wai-hung, also a HKCTC Member, said that it was vital to promote awareness of testing and certification among young people, as well as an understanding of testing methods and quality standards.

"The T&C industry helps strengthen Hong Kong's reputation of having high product quality," he said. The judging criteria included well-executed data collection procedures, succinct reports and clear explanations of findings. There were also marks for creativity in presentation and making the videos.

"The senior division's winning team developed a testing method for determination of the amount of some heavy metals in water by means of filtration." Dr Yung said. "They conducted testing cautiously and presented a clear comparison of unfiltered and filtered samples." As for the champion of the junior division, he appreciated their story-telling technique to narrate how they carried out the testing of caffeine in different brands of tea in an intriguing manner.



Chan Cheuk Yin and Ng Ki San from CCC Yenching College, champions in the junior division, and their vice-principal received the trophy and certificate from Dr Yung.



### Junior Division Champion

The champion team of the junior division noted that tea, which contains caffeine, is a common drink in the Chinese society. They were interested in determining the amount of caffeine in different kinds of tea. Through this competition, the team realised the importance of meticulous procedures to ensure accurate testing results and would pay more attention to little things in their daily life. They shared that they had put much effort and time on their dialogue and facial expressions so as to make their performance more natural in the video.



Dr Yung presented the trophy and certificate to Cao Tian Yi and Chan Hei Lam from St Paul's Convent School, champions in the senior division.



### Senior Division Champion

The champion team of the senior division expressed that they were inspired by the lead-in-water incidents in various public housing estates in the past years, and decided to develop a cheap and fast method for determining the amount of heavy metals in water. They made use of hand warmer powders to construct a filtration device that could effectively remove copper and lead from tainted water. Through this competition, they understood the importance of testing and how it played an essential part in their everyday life.

The competition emphasised collaboration and also encouraged students to learn video production and presentation skills.