

# Science competition ignites student interest in innovative testing

Testing and certification are of the essence, not only ensuring quality and safety of everyday products, but also safeguarding consumer interests, thereby enhancing their confidence. To improve understanding of the importance of testing and certification and spark interest among local youngsters, the Hong Kong Council for Testing and Certification (HKCTC) has sponsored the HKCTC Special Award for Outstanding Project in Testing since 2016. The award is part of the Hong Kong Youth Science and Technology Innovation Competition, one of Hong Kong's largest contests of its kind, which features numerous categories and is organised by the Hong Kong New Generation Cultural Association.

Students were invited to submit original research projects or inventions for one of the following categories: mathematics, physics and engineering; chemistry and materials; biology and health; energy and environmental science; or computer science and information technology.

A total of 13 finalists with a diverse range of testing-related projects were in contention for the award. On the day of final judging, finalist teams explained the unique features of their projects in a three-minute presentation before answering follow-up questions raised by the judges.

The judges were impressed by the range of entries, from health concerns and food safety to domestic hygiene and environmental protection, which showed that participating students are well aware of society's current needs and challenges. They commended that in addressing different issues, the students had used their creativity to develop viable and cost-effective solutions.

Importantly, the teams also demonstrated how they had conducted rigorous testing to prove scientifically that the results of their projects were consistent and as expected. When some teams' tests initially produced unexpected outcomes, they persevered and made necessary modifications. Such steps helped them to acquire a scientific mindset and to learn that they need to work on experiments persistently to arrive at reliable results.

"Testing and certification will continue to grow in importance given the increasing demand for quality and safe products in society. The sector can offer a wide range of opportunities for young people. Through raising awareness of the role and value of testing and certification, I hope that more youngsters will consider a career in the sector," the HKCTC Chairman, Prof Albert Yu, said.



The Chairman of the Hong Kong Council for Testing and Certification, Prof Albert Yu (centre), and Members, (from left) Mr Kenneth Leung, Mr Stephen Liang, Dr Ann Leung and Mr Patrick Lee, formed the judging panel of the Special Award.

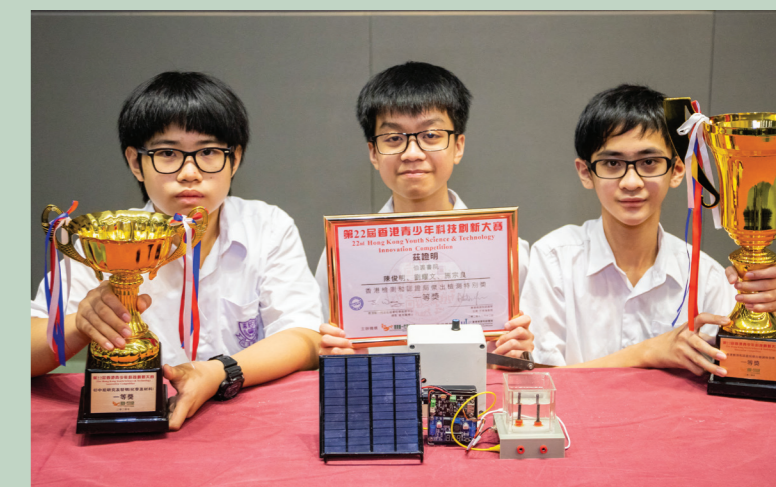


## First Place Grand Award

### Project: Homemade Chlorine Solution Producer

The shortage of disinfectant products under the COVID-19 pandemic prompted the winning team to develop a cost-efficient method for ordinary households to produce an effective disinfectant with eco-friendly and easy-to-find materials. The team undertook stringent tests to determine the disinfecting efficacy of solutions with varying ratios of chlorine and other ingredients in order to identify the optimum. Using a simple hand-cranked generator and adding graphite and saline solution, their project proved that 500 ppm (parts per million) of free chlorine could be produced by turning the crankshaft 30 times, and this was sufficient to kill some commonly found bacteria like E. coli.

"Testing was a key part of the process. We tested our chlorine solution countless times to identify the ideal ratio for a household disinfectant. We also needed to determine how many times we needed to turn the crankshaft to produce a chlorine solution from 500 to 1,000 ppm accurately," the team said. Throughout the process, they appreciated the importance of repeated testing to ensure accuracy. Looking forward, they would continue to apply what they have learnt in science and develop solutions to tackle problems encountered in daily life.



Man Kwan Pak Kau College:  
(from left) Sze Chung-leung, Chan Chun-ming and Lau Yiu-man



## Second Place Grand Award

### Project: Bio-bandages (Crab Hydrogels)

Noting that most of the bandages in the market are non-biodegradable, the team developed an eco-friendly adhesive bandage, made from chitin, a naturally available polysaccharide found in crab shells. Chitin can be transformed into a hydrogel ideal for bio-bandages which are biodegradable. They made use of an instrument called Fourier Transform Infrared Spectroscopy to accurately qualify and quantify the various essential substances for the bio-bandages and to confirm their stability when subject to different treatments so as to ensure that the bandage is fit to use on human skin.

Bio-bandages are surface waterproof and are effective in stopping bleeding wounds. "We conducted a lot of research on the international standards and requirements for bandages. In compliance with the established standards, we carried out tests for various properties, including elasticity and water-proof ability," the team members said. "Through this project, we realised that testing and certification help ensure that products complied with relevant safety standards and requirements before they are made available to consumers. This has boosted our interest in testing." The team also hopes that their invention can be widely used in daily life.



Carmel Pak U Secondary School:  
(from left) Leung Ho-yin, Lee Wing-hong and Li Chung-shing



## Third Place Grand Award

### Project: Atlantic Salmon – Rainbow Trout Identifier

From time to time, we heard media reports that rainbow trout are sold as Atlantic salmon, which can be much more expensive. Eating the raw rainbow trout, a freshwater fish, may also cause health hazards due to presence of parasites. However, Atlantic salmon and rainbow trout are similar in meat appearance, leading to confusion easily. To safeguard consumer interests and safety, the team invented a user-friendly handheld device able to distinguish Atlantic salmon from the freshwater rainbow trout. The device, intended for the general public, is an ohmmeter which can detect the stronger electrical resistance in Atlantic salmon because that type of fish has a comparatively higher fat content.

The main challenge for the team was to determine the threshold of the electrical resistance. "It was unstable initially, so we conducted multiple tests with different conditions and parameters" they said. "We eventually found that we could achieve more stable and consistent results by leaving the frozen fish at room temperature for 10 minutes. There was a lot of trial and error involved in the process and we had to keep modifying our methodology to prove our theory." They cherished very much the experience gained from participating in the competition.



The Chinese Foundation Secondary School:  
(from left) Jonathan Wong, Ho Chun-hei and Esther Chow