

Tang Shiu Kin Victoria Government Secondary School - Egg Crashes into the Earth (Enhanced version)

學校	Tang Shiu Kin Victoria Government Secondary School
老師	STEM Team
應用科目	Design and Technology, Physics, Science, Business, Accounting and Financial Studies
年級	S2
學習目標	Students are expected to design and make an Egg Protector to protect an egg falling freely from height. The knowledge of free-fall object, momentum, impulse and anti-vibration will be applied.
運用了的電子教學設備或工具	GoPro and Drone

Introduction of Lesson Design

This project got its premiere in our school as early as 1996 when it was my first year of teaching. It was conducted in junior secondary 3 Design and Technology (D&T)

curriculum until the era of millennium. It was primarily a science project but enhanced with the elements of freehand sketching, design and aesthetics



before being adopted into D&T curriculum. Furthermore, the concept of authentic learning once prevailed. The concept of costing was taken into consideration. A “tuck shop” was setup in class for selling a wide variety of pre-selected consumable materials and tools, such as drinking straws, A4 sheets, and adhesive tapes, etc. Students were free to form a group of two and a sheet of pictorial dollar notes was given for them to buy the type and quantity of materials they needed. Every group was given 2-3 minutes to present their design concepts and technicalities with their annotated 3D freehand sketches before the implementation stage. The highlight of this project or the distinctive attribute that made it being differentiated from the primary level was NO parachute, NO wings and NO Bamboo Dragonfly (Hopter) allowed to be used.

Lesson Plan and Impact

With a view to respond to the megatrend of STEM education, our principal requested STEM team to incorporate an enhanced version of “Egg Crashes into the Earth” project into a formal curriculum with cross discipline of D&T, Physics, Science, and Business, Accounting and Financial Studies (BAFS). The design and implementation of this project was basically conducted in D&T formal lessons that were two periods per week. This project totally lasted for 3 months from September to November. The pre-requisite knowledge about the topics of free-falling objects, gravity, momentum, impulsive force and

vibration, etc were provided in a mass lecture given by the subject department heads of Physics, Science and D&T. The awards were also thoughtfully designed to cater for the notion of multiple intelligences and learner' s diversities. Therefore, students of different talents had equal opportunities to strive for their best to achieve the awards.

The awards list

STEM 最強設計大獎 (冠、亞、季軍)

STEM Strongest Design Award (Champion, First Runner UP, Second Runner Up)

最佳外型設計獎

Best Appearance Design Award

最具環保概念獎

Most Environmentally Friendly Concept award

最具創意獎

Most Creative Award




最具成本效益獎

Most Cost Effective Award

During the procurement stage, each group of students was given \$33.5 to buy their consumable materials to build their protector. Students had the chance to practise Arithmetic and fill in the balance sheet. A debriefing session was conducted to conclude this cross-curricular project. Department

head of BAFS took the leading role in the debriefing session to impart the concepts of cost accounting to S2 students that not only the cost of materials was taking into account. After that session, videos and photos from GoPro/Drone and the competition results were used to analyze which were the effective designs.

All in all, we grasped the opportunity of STEM education to “revitalize” a classical science project with vivid and applaudable impacts to the students and teachers. Thanks to the miniaturization of accelormeter and WiFi shield, the embedment of sensors into the “egg protector” is possible in the near future. We were expecting to “revolutionize” this classical project into a “High-Tech-High-Impact” STEM project in a sustainable way.

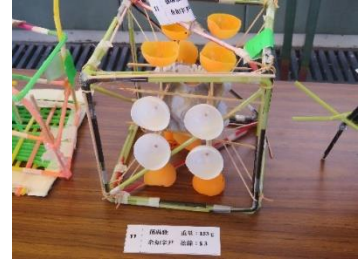
		
<p>Problem solving and reflection – failure after qualifying round</p>	<p>Students were making their project during the D&T formal lessons.</p>	<p>Free falling – the top 3 were attempting to challenge the ultimate height of the school building.</p>



Pre-requisite knowledge – mass lecture for students of whole S2 level with 3 Department of Heads.



“Technology services Education” – drone taking aerial view during final competition.



“Egg protector” with shock- absorbing devices.



Learning celebrations – the final competition was conducted in playground, guests and external judges were invited.



Learning celebrations – learning with funs and interactions, students were highly motivated to learn and were proud to deploy their learning outcomes to the public.

