

Teachers presented with the
Certificate of Merit

Mr CHIN Ho-wai

(Years of teaching : 9 years)

Ms IP Chui-ngor, Irene

(Years of teaching : 25 years)

Mr WAT Hoi-tim, Timmy

(Years of teaching : 23 years)

Dr WONG Chi-kit, Clement

(Years of teaching : 18 years)

Mr CHENG Tsz-him, Justin

(Years of teaching : 6 years)

School

**Cheung Sha Wan Catholic
Secondary School**

Subject taught

**Science (S1-3)
Chemistry (S4-6)
Biology (S4-6)
Physics (S4-6)
Combined Science (S4-6)**

▲ From left to right: Mr CHIN Ho-wai, Mr Justin CHENG, Mr Timmy WAT,
Ms Irene IP and Dr Clement WONG

Science breeds independent minds

Teaching Philosophy

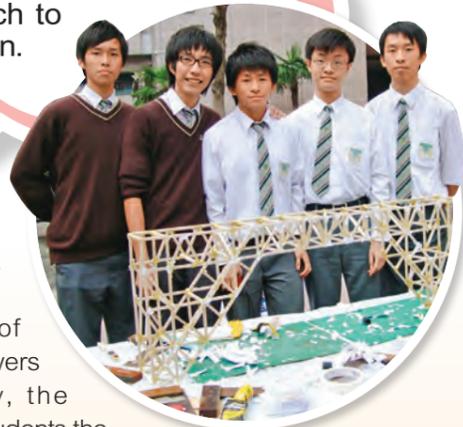
" The Science (S1-3) programme is designed to promote student interest in science. Through structured scientific investigation, students attain not only mastery of subject knowledge and practical skills, but also positive attitudes towards science. They become self-motivated in the pursuit of science, and are successful in secondary school and beyond. "





Interview with the Teachers

Without a good foundation, the learning of science is like building a castle on sand. At Cheung Sha Wan Catholic Secondary School, scientific investigation is introduced to all S1-3 students in order to develop a systematic approach to knowledge acquisition.



▲ Students preparing for the Bridge Design Contest

Since scientific investigation was introduced as part of the Science (S1-3) curriculum seven years ago, a great deal has been achieved. Today, students are eager to learn through conducting experiments to find answers or solutions to problems.

Mr CHIN Ho-wai recalls one of his experiences of doing demonstrations in class, "I was teaching what a vacuum is, so I put a balloon inside a jar and started the vacuum pump. The balloon then inflated; and I asked the students why it would happen."

Unexpectedly, the naughtiest in the class spoke up and gave the answer accurately. "This shows weaker students can also be inspired through interactive learning," says Dr Clement WONG.

In order to nurture students' curiosity in science, the teachers increase the frequency of doing demonstrations and experiments in lessons, despite the tight teaching schedule.

A journey of discovery

Scientific investigation develops students' thinking skills and their curiosity in learning more about the dynamic world. "Thus, students are taught to observe, make assumptions, experiment, analyse the results and compare with references before making judgements," says Ms Irene IP.

To promote scientific investigation, the school has developed experimental projects suitable for students of different levels, for example, the making of the most efficient windmill.

In this project, different groups of students investigated various factors affecting the efficiency of the windmill and the results of different groups were pooled together so that students would have the required data to reflect on before embarking on the project



◀ Students preparing for the Water Pipe Competition

of designing the most efficient windmill.

Instead of giving the answers straight away, the teachers give students the opportunity to find out the answers by themselves.

"We are not teaching cooking where steps need to be followed one after the other, we have to leave space for students to solve problems through the experiment," says Dr WONG.

Building confidence through competitions

Participating in competitions outside school is also a way to let students take part in serious investigation, build confidence, develop presentation skills and learn better time management.

"I remember once I told the students that I would not go into the presentation room with them; they were so frightened and nervous. But in the end, they performed very well," says Mr Justin CHENG.

"It's only a matter of preparation and confidence. If they prepared well, they could face the challenges on their own," says Mr Timmy WAT.

Encouraging results

The result of the programme is encouraging. Now, more than 80 per cent of the students have chosen at least one science subject at the senior secondary level, and over the past six years, quite a number of students studied Science at universities and graduated with flying colours.

Teachers' Sharing

"It is not knowing much, but realising and relishing things interiorly, that contents and satisfies the soul." — Saint Ignatius of Loyola

Programme aim

The heart and soul of science education lies not in cold theorem memorisation or mindless examination drilling, but in the development of a scientific mind, which is of great value to students in their creative problem-solving in everyday life. Our programme develops students' scientific mind through focusing on scientific investigation in the Science (S1-3) curriculum.

Stratagem

Students are introduced to the concept of scientific investigation in a one-month programme in S1. During this month, senior Science teachers whose students had gone for public examinations will team up with the junior Science teachers to conduct the laboratory sessions in split-class mode. This practice will help the S1 students master the science process skills better and cater for learner diversity.

S1 and S2 students are given a task-oriented investigation project each year, in which they must apply the techniques of scientific inquiry to find a solution to the problem or to draw a logical conclusion. Some of the project titles include "investigating the factors affecting the efficiency of a windmill", "designing the most powerful water-propelled vehicle" and "designing a device to protect a falling egg".

Students are given two projects during their S3 year, one in biology and one in physics. Besides experimental techniques and investigative skills, the S3 investigation projects focus on critical thinking. By the end of S3, students should be able to design and carry out a scientific investigation, as well as critically state its limitations and sources of errors.

For those students who have a high potential in science, they will be invited to join



▲ Students learning in a supportive environment

the after-school training programmes and inter-school science competitions. The laboratories are often opened after school for students to try out experiments and work on their projects. Self-directed learning is what we treasure. Students' inquisitive minds should be given opportunities to grow.

Accomplishments

Over the past few years, we have seen improvement in students' performance in examinations as well as their active participation in a wide range of intra- and inter-school events. Students enjoy science more and are generally more eager to learn. Also, there are an increasing number of graduates pursuing careers in various fields and disciplines related to science.

Conclusion

We may not be rich, but we strive to be resourceful. Our students may not be bright, but we will make them shine. With the "fertilisers" carefully formulated by "farmers", we hope students can grow further. We shall continue our efforts and be busy "farmers" and serve our future generation, as we have done so in the past.



Assessment Summary

Enhancing effective science learning through a coherent and holistic school-based curriculum focusing on scientific investigation



▲ S1 students working on a scientific investigation

These five teachers displayed a high level of informed professional knowledge of current curriculum objectives and applied pedagogical content knowledge effectively in their lessons. They believed that through structured inquiries, students attained not only mastery of subject knowledge and experimental skills, but also positive attitudes towards science. They had started working on the school-based curriculum since the 2005/06 school-year with a focus on scientific investigation and had now developed a holistic curriculum for the Science Education KLA. The team had kept good documentation of the various stages of the implementation of the curriculum. They had adopted the Planning-Implementation-Evaluation Cycle in curriculum planning with clear evaluation criteria. Evaluation results were taken seriously for modifying the curriculum and the assessment methods.

The team demonstrated very good classroom skills, attended to student learning needs and performance. The teacher-student interaction and student participation in class were good and students were learning in a supportive environment. The team promoted student interest in learning science through encouraging them to participate in various science activities and competitions both inside and outside school. They opined that participation in science investigations will promote independent learning

and help develop students' learning skills and ability to think scientifically and critically. Under the guidance of the team, more and more students were participating in various science competitions and lots of opportunities were offered for students who wished to broaden their horizons, to learn on their own and to fulfil their potential in science.

The team demonstrated a clear understanding of the broad applicability of the mastery of the investigative skills in helping students grasp the nature of science and the value of scientific exploration. They had developed very effective curriculum materials focusing on the various science process skills to develop students' scientific thinking.

The five teachers worked well as a team, they shared in regular and irregular meetings and peer lesson observations were held for professional dialogue and enrichment. They were from different disciplines with varied years of teaching experience and they worked closely with other teachers in the Science Education KLA to develop a holistic plan for school-based curriculum to ensure vertical and horizontal coherence.

Way of Obtaining Information of the Teaching Practice



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