Physics

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Preface

The emergence of a highly competitive and integrated world economy, rapid scientific and technological innovations, and the ever-growing knowledge base will continue to have a profound impact on our lives. In order to meet the challenges posed by these developments, Physics, like other science subjects, will provide a platform for developing scientific literacy and the essential scientific knowledge and skills for lifelong learning in science and technology.

Physics is one of the most fundamental natural sciences. It involves the study of universal laws, and of the behaviours and relationships among a wide range of physical phenomena. Through the learning of physics, students will acquire conceptual and procedural knowledge relevant to their daily lives. In addition to the relevance and intrinsic beauty of physics, the study of physics will enable students to develop an understanding of its practical applications in a wide variety of fields. With a solid foundation in physics, students should be able to appreciate both the intrinsic beauty and quantitative nature of physical phenomena, and the role of physics in many important developments in engineering, medicine, economics and other fields of science and technology. Study of the contributions, issues and problems related to innovations in physics will enable students to develop an integrative view of the relationships that hold between science, technology, society and the environment (STSE).

Objectives

The overarching aim of the Physics Curriculum is to provide physics-related learning experiences for students to develop scientific literacy, so that they can participate actively in our rapidly changing knowledge-based society, prepare for further studies or careers in fields related to physics, and become lifelong learners in science and technology.

The broad aims of the curriculum are to enable students to:

- develop interest in the physical world and maintain a sense of wonder and curiosity about it;
- construct and apply knowledge of physics, and appreciate the relationship between physical science and other disciplines;
- appreciate and understand the nature of science in physics-related contexts;
- develop skills for making scientific inquiries;
- develop the ability to think scientifically, critically and creatively, and to solve problems individually or collaboratively in physics-related contexts;
- understand the language of science and communicate ideas and views on physics-related issues;
- make informed decisions and judgments on physics-related issues; and
- be aware of the social, ethical, economic, environmental and technological implications of physics, and develop an attitude of responsible citizenship.

Physics Learning and Teaching Strategies in LKKC

(A) Learning Targets

Knowledge and Understanding

- phenomena, facts and patterns, principles, concepts, laws, theories and models
- vocabulary, terminology and conventions
- knowledge of techniques and skills
- applications of physics

Water rockets

Skills and Processes

- Scientific thinking
- Scientific investigation
- Practical work
- Problem-solving
- Decision-making
- Information handling
- Communication
- Collaboration
- Self-directed learning

Circular motions

A very long pendulum

Values and Attitudes

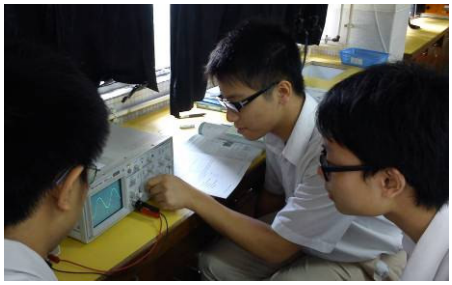
- towards themselves and others
- towards physics and the world
- towards learning

(B) Learning and Teaching Activities

1. Practical work

As Physics is a practical subject, it is essential for students to gain personal experience of science through activities involving designing and performing experiments.

Van der Graaf generator



Cathode ray oscilloscope

Timing oscillations

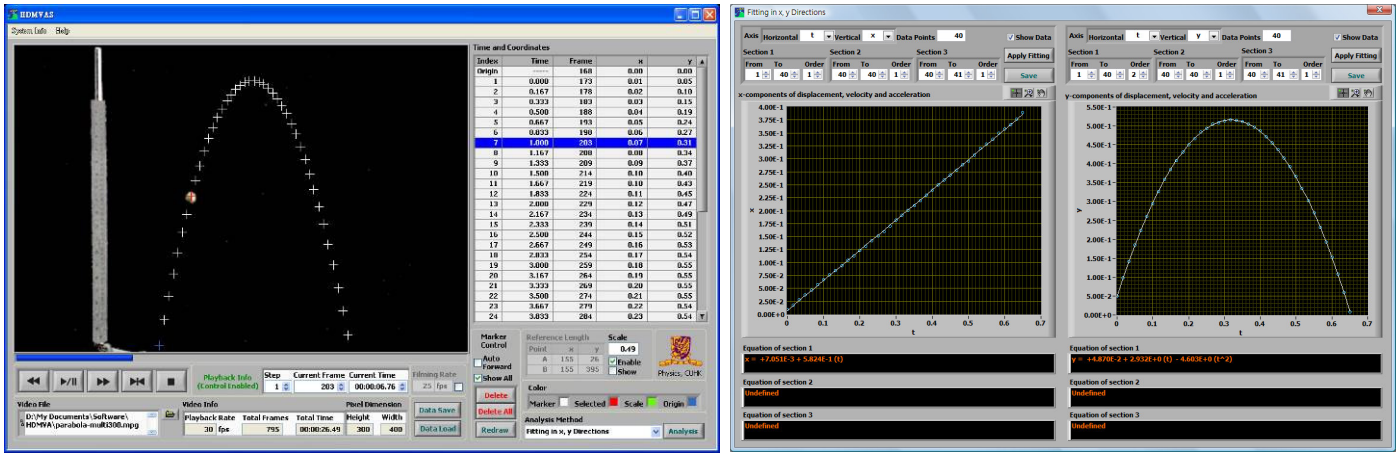
Data loggers

2. Investigative Study

Designing and constructing an electric circuit to perform a simple function.

3. Information technology (IT) for interactive learning

With the appropriate use of IT-mediated resources, teachers can enhance students' understanding of physics concepts and processes, and develop their IT skills which are useful for lifelong learning.



Motion Video Analysis (MVA) software

4. Searching for and presenting information

Searching for information is an important skill in the information era. Students can gather information from various sources such as books, newspapers, magazines, scientific publications, multimedia, digital media and the Internet. Information should not simply be collected selectively by students but must be categorised, analysed and put to some use, for example in a presentation of findings.

5. Reading to learn

Reading to learn can be used to promote independent learning and help students to understand various aspects of the past, present and possible future development of physics. Articles which emphasise the interconnections among science, technology, society and the environment can reinforce and enrich the physics curriculum by bringing in current developments and relevant issues, and so arouse students' interest in learning.

6. Discussion

Questioning and discussion in the classroom promote students' understanding, and help them develop higher-order thinking skills and an active approach to learning. Also, presenting arguments enables them to develop the following skills: extracting useful information from a variety of sources; organising and presenting ideas in a clear and logical way; and making judgments based on valid arguments.

7. Providing life-wide learning opportunities

As learning can take place anywhere, it is essential to provide out-of-school learning experiences for students. Life-wide learning opportunities can widen students' exposure to the real scientific world. Examples of appropriate learning programmes include popular science lectures, debates and forums, field studies, museum visits, invention activities, science competitions, science projects and science exhibitions.

Visit to Hong Kong Observatory

Visit to Daya Bay Nuclear Power Plant

(C) Catering for the Gifted Students

The needs of students with special gifts or talents in physics should be catered for. By allowing gifted students to move quickly through particular courses, for example, the Physics Olympiad program, they can develop their potential to the fullest.

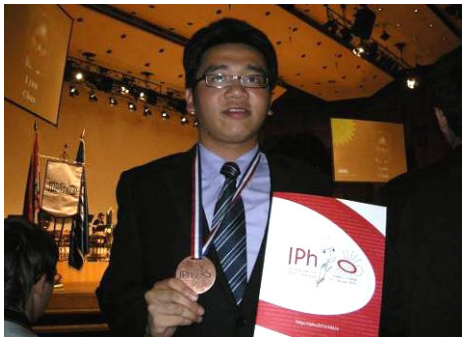
International Physics Olympiad (IPhO)

Year	Name (Class)	Award
2009 (Mexico)	YEUNG Wing Ki (6S)	Bronze
2010 (Croatia)	TSANG Hok Kan (6S)	Bronze
2011 (Thailand)	WONG Yuk Fai (5D)	Silver

Pan-Pearl Delta plus Chinese Elite Schools Physics Olympiad

Year	Name (Class)	Award
2008	YEUNG Wing Ki (5E)	Third Prize (Bronze)
2009	CHENG Wing Fat (6S)	First Prize (Gold)
	YEUNG Wing Ki (6S)	Second Prize (Silver)
	LAU Chun Man (6S)	Third Prize (Bronze)
2010	TSANG Hok Kan (6S)	Third Prize (Bronze)
2011	WONG Yuk Fai (5D)	First Prize (Gold)
2013	CHENG Man Hin (5D)	First Prize (Gold)

YEUNG Wing Ki (right 2) was awarded Bronze medal in IPhO 2009.



TSANG Hok Kan was awarded Bronze medal in IPhO 2010.

WONG Yuk Fai (right 2) was awarded Silver medal in IPhO 2011.

Hong Kong Physics Olympiad

Year	Name (Class)	Award	Year	Name (Class)	Award
2007	IP Tse Hung (6S)	Third Honour	2008	CHAN Yin Fung (6S)	Third Honour
	CHENG Wing Fat (4E)	Third Honour		CHENG Wing Fat (5E)	Third Honour
	YEUNG Wing Ki (4E)	Third Honour		YEUNG Wing Ki (5E)	Third Honour
	／	／		LAU Chun Man (5E)	Third Honour
2009	TSANG Hok Kan (5D)	Third Honour	2010	CHOW Man Lok (5E)	Second Honour
	CHU Cho Leung (4D)	Third Honour		CHU Cho Leung (5D)	Second Honour
	FAN Siu Wai (4D)	Third Honour		WONG Yuk Fai (4D)	Second Honour
2011	WONG Yuk Fai (5D)	First Honour	2012	YEUNG Yuk Wa (5E)	Third Honour
	LEE Chun On (5E)	Second Honour		CHENG Man Hin (4D)	Third Honour
	／	／		LAM TSZ LOK (3B)	Merit Prize
2013	LAM Tsz Lok (4E)	First Honour	2014	CHAN HIU CHUN (3C)	Second Honour
	／	／		LI SHING YAN (2C)	Second Honour
	／	／		WU MAN HO (4E)	Third Honour

The Road Ahead

The physics curriculum makes it possible for students to pursue a degree or sub-degree course in a specialised study or other discipline which treasures a good foundation of knowledge and skills in physics, and values and attitudes. The ability to apply physics knowledge and skills to daily life phenomena will enable students to study effectively in a variety of vocational training courses. Furthermore, the development of logical thinking and problem-solving skills among students will be valued in the workplace.