



中華人民共和國香港特別行政區政府總部教育局
Education Bureau
Government Secretariat, The Government of the Hong Kong Special Administrative Region
The People's Republic of China

本局檔號 Our Ref. : EDB/CDI/SC/ISS/20/1

電話 Telephone : 2892 5801

來函檔號 Your Ref. :

傳真 Fax Line : 2117 9240

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Legislative Council - Panel on Education
(Attn: Miss Odelia Leung)
Legislative Council Building
8 Jackson Road
Central
Hong Kong

Dear Miss Leung,

**Response to the letters/submissions on the subject
of New Senior Secondary Biology curriculum guidelines**

At the recent two meetings of the Legislative Council Panel on Education, three submissions from the Concern Group for Hong Kong Science Education with no specified dates, a letter from Dr Pauline CHIU dated 30 April 2009 and another one from a group of scientists, educators and professionals dated 5 May 2009, concerning the New Senior Secondary Biology curriculum guidelines were referred. Our consolidated response to the submissions is set out at the **Annex**.

Yours sincerely,

(Dr CHEUNG Kwok-wah)
for Secretary for Education

Encl.

**Response to the letters/submissions on the subject
of New Senior Secondary Biology curriculum guidelines**

This paper aims to delineate the focuses of learning of the topic “Evolution” in the New Senior Secondary Biology curriculum (the Biology curriculum). The rationale and aims of the Biology curriculum and the design principles of the curriculum documents are also outlined to facilitate a holistic understanding of the focuses of learning of the topic “Evolution”.

Rationale and Aims of the Biology Curriculum

2. The Biology curriculum framework aims to provide biology-related learning opportunities to help students to develop scientific literacy. The broad aims of the Biology curriculum are to enable students to construct and apply knowledge of biology; understand the nature of science in biology-related contexts; develop the ability to make scientific inquiries; and think scientifically, critically, and creatively. There are curriculum emphases to strengthen students’ understanding of the nature of scientific inquiry in biology, the interconnections between science, technology, society and the environment, and biology as a dynamic body of knowledge. For example, students should be able to understand that science is a human endeavour, engage in the systematic quest for explanations of the natural world based on evidence, appreciate the role of science and technology in understanding of the living world, and be aware that biological knowledge and theories are developed through observations, hypotheses, experimentations and analyses.

Design Principles of the Curriculum Documents

3. The Biology Curriculum and Assessment Guide (C&A Guide) is designed to provide the rationale and aims of the subject curriculum, followed by chapters on the curriculum framework, curriculum planning, pedagogy, assessment and use of learning and teaching resources. To understand the interplay between key components, all chapters in the C&A Guide as well as all parts of each chapter should be read in a holistic manner. In Chapter 2 “Curriculum framework”, it embodies the key knowledge, skills, values and

attitudes that students are to develop. All its parts including “Overview”, “Curriculum emphases”, “Students should learn and should be able to” and “Suggested learning and teaching activities” are interconnected. The curriculum framework forms the basis on which schools and teachers can plan their school-based curriculum, and design appropriate learning, teaching and assessment activities.

Focuses of Learning of the Topic “Evolution”

4. In Topic II “Genetic and Evolution” of the Biology curriculum, only evolution is included as it is supported with evidence to explain the origin of species. The Biology curriculum stresses on developing students’ ability to construct and apply scientific knowledge, skills and processes related to scientific inquiry and understanding of the nature of science. In the topic “Evolution”, the emphasis is put on Darwin’s Theory as it is currently the most widely accepted scientific theory on evolution. Students are expected to understand the process and mechanism of evolution based on Darwin’s Theory. Besides, students should recognise that biological knowledge and theories are developed through observations, hypotheses, experimentations and analyses, and are aware of the dynamic nature of biological knowledge.

Exploration of Other Explanations

5. In the Biology curriculum framework, Creationism or Intelligent Design, which was mentioned in the recent submissions to LegCo Panel on Education concerning the Biology curriculum, is not included. In addition to Darwin’s Theory, students are encouraged to explore other explanations on evolution such as that of Jean Baptiste Lamarck and Sir Alfred Russel Wallace¹. The purpose of exploring these explanations is to further enlighten students that scientific knowledge is not merely factual knowledge but is originated from and driven by the curiosity of scientists. Scientific knowledge is constructed and accumulated by the effort and determination of scientists to understand the natural world based on evidence.

6. The exploration of other scientific explanations on evolution is to supplement the learning of Darwin’s Theory and also enhance students’

¹ Lamarck and Wallace were well-known scientists who contributed to the development of theories on evolution.

understanding of the nature of science through studying the historical development of evolution theory. They are not considered as an alternative to Darwin's Theory. The C&A Guide lists the study of the work of other biologists (e.g. Jean Baptiste Lamarck and Sir Alfred Russel Wallace) on evolution in the "Suggested learning and teaching activities" of the topic "Evolution" for teachers' consideration. Non-scientific explanations are not included.

7. The Education Bureau has been organising professional development programmes for enriching Biology teachers' knowledge on the topic "Evolution" and enhancing their understanding of the focuses of learning. More than 400 teachers have attended the programmes in these few years.

To Cater for Learner Diversity

8. The Biology curriculum framework adopts a flexible and open approach to meet the varied needs of students. It outlines the major content areas of each topic and indicates the knowledge, concepts and skills that students are to develop at senior secondary level. This provides a basic framework upon which the learning and teaching activities can be developed.

9. Schools and teachers are encouraged to plan for their school-based curriculum development and design appropriate learning activities to help their students better achieve the learning outcomes listed in the C&G Guide. They could consider extending the discussion on evolution to other scientific explanations to cater for the diverse interests and abilities of students. For example, in the historical development of evolution theory, there were two main theories (Darwin versus Lamarck), each with its own supporters. Teachers can go through the scientific arguments with students and show how current scientific evidence available is in favour of Darwin over Lamarck. The study of the historical development of evolution theory will help students recognize the importance of evidence in supporting, modifying or refuting proposed scientific theories. They would be able to understand and appreciate the process of evolution and develop curiosity about the origin of species.

10. In school-based curriculum development, schools should ensure that students are provided with appropriate learning activities so as to develop their core scientific concepts and essential process and thinking skills as set out in the Biology curriculum.

Development of the Biology Curriculum

11. The Biology C&A Guide is prepared by the CDC-HKEAA² Committee on Biology (Senior Secondary) (the Committee) which comprises academics from tertiary institutions, heads of schools, practising teachers, professionals from related fields, representatives from the HKEAA, as well as officers from the Education Bureau. In the course of developing the Biology curriculum, the Committee has taken into consideration the widely accepted notions about science, science theory, scientific methods, learning and teaching of science and other aspects related to curriculum development in different places.

12. The Committee treasures views and suggestions on the Biology curriculum. In this regard, it had consulted experts in the subject in the Mainland and overseas. They included fellow(s) of the Chinese Academy of Sciences, academics of the tertiary institutions and teachers. Rounds of consultation had been conducted and meetings with academics of the tertiary institutions were held. Views and comments collected had been duly considered. In addition, a wide range of latest curriculum documents from the Mainland and other countries including United Kingdom, United States, Australia and Canada had been examined.

13. To ensure the curriculum articulates with the international standards, the draft curriculum documents were sent to overseas agencies such as the Netherlands Institute for Curriculum Development for benchmarking. According to the comments of overseas benchmarking agencies, the Biology curriculum has a good coverage in content and is comparable to overseas programmes in breadth and depth. The benchmarking agencies have remarked that the curriculum is also praiseworthy in putting emphasis on nature and history of Biology and commendable in the commitment to the development of scientific thinking as well as positive attitudes and values.

14. The whole-school curriculum frameworks set out by the Curriculum Development Council in basic education that promotes learning to learn in 2001 and the New Senior Secondary curriculum in 2009 respectively have accommodated school-based initiatives of other learning elements through project learning, reading, and flexible curriculum time. These are useful for meeting the different needs and contexts of schools as well as the interest of students.

² CDC-HKEAA – Curriculum Development Council and Hong Kong Examinations Assessment Authority

Way forward

15. Science education plays a significant role in students' whole-person development. The Education Bureau is committed to providing quality school science education for our students. The Biology curriculum will be under constant review and evaluation in the light of classroom experiences, students' performance and the changing needs of students and society. All comments and suggestions on the curriculum and assessment framework are welcome.

Education Bureau
June 2009