

## Chapter 2

### The Current Mathematics Curriculum of Hong Kong

2.1 Currently there are 7 mathematics subjects at various levels of schooling. These subjects are Primary Mathematics (P.1-6), Secondary Mathematics (S.1-5), Additional Mathematics (S.4-5) and the sixth form subjects (S.6-7): AS-level Mathematics and Statistics, AS-level Applied Mathematics, A-level Pure Mathematics and A-level Applied Mathematics. The Primary and Secondary Mathematics are subjects for "all" while the others are studies to suit students of different abilities and needs.

#### Primary

2.2 The existing Primary Mathematics Syllabus was developed in 1983. Its emphasis is on how students learn rather than how teachers teach. It also aims at fostering a right learning attitude in students, developing students' problem solving skills and their abilities to explore mathematical situation, discover relationships, analyze, reason and make judgement. It adopts a "spiral approach" so as to ensure that some topics are regularly revisited at different levels of schooling. However, it is criticized that the primary mathematics curriculum is too tight and mathematics is mostly learnt through intensive drilling particularly at the senior primary levels. In addition, there is an overlapping in the mathematics curricula at the pre-primary and P.1 levels.

2.3 TTRA, introduced in 1990 and modified and renamed as TOC in 1994, was expected to further enhance the spirit of the Primary Mathematics Syllabus. Targets on developing an ever-improving capability to communicate, inquire, reason and conceptualize mathematically and solve mathematical problems, appreciate the beauty of mathematics and apply mathematics to different contexts through the learning of the knowledge, concepts and skills/procedures in number, measures, algebra, shape & space and data handling are highlighted. However, it is worried that precision in TOC assessment might hamper learning and reinforce comparison. The heavy workload of teachers involved in performing continuous assessments (particularly for the HOTs) has also begotten teachers' grievances.

## Secondary

2.4 This current single teaching syllabus for all secondary schools was developed in 1985. It is a core subject in S.1-5 and it serves as a continuity of the development of numeracy begun in the primary schools. Similar to the primary curriculum, a “spiral approach” is adopted. Its main objectives include introducing to students a general sense of the pattern and power of mathematics, giving more emphasis to the nature and application of mathematics, and providing students with a basis for further work in science and mathematics. But more emphasis has been laid on treating this subject as a tool rather than a way of thought.

2.5 To meet the abilities of different groups of students, *Tailoring Guide for the Secondary Mathematics Curriculum* was issued in 1996. The most fundamental concepts (roughly two thirds of the whole syllabus) are identified as the “tailored part”. The less able students are expected to complete only the “tailored part” in the 5 years of secondary education. To cope with this change, the HKEA has also changed the format of the CE-level mathematics paper in 1998. There are two sections. Section A only consists of questions on the tailored syllabus while Section B questions on the whole syllabus. The tailored syllabus of Secondary Mathematics is found to be well received by schools with less able students.

2.6 On the other hand, students in S.4 & 5 who are more able in mathematics may choose to take the subject Additional Mathematics which was developed in 1992<sup>3</sup> and aims to provide better foundations for Sixth Form mathematics and strengthen students’ critical mathematical thinking. Hence, Additional Mathematics is usually taken by students of Science classes and not by those of Arts or Commerce classes. The main criticism of the subject is its overlapping in some of the content areas with the Secondary Mathematics, AS-level Mathematics & Statistics and A-level Pure Mathematics. This has brought some difficulties to teachers teaching the subjects concerned.

## Sixth Form

2.7 In the wake of the recommendations of the ECR No. 2 regarding Sixth Form

---

<sup>3</sup> Before 1992, there was only an examination syllabus for the subject.

curriculum, two AS-level and two revised A-level mathematics syllabuses (namely, AS-level Applied Mathematics, AS-level Mathematics & Statistics, A-level Applied Mathematics and A-level Pure Mathematics) were produced in 1991 and 1992 respectively.

2.8 AS-level Mathematics & Statistics is designed for S.6 & 7 students who do not plan to specialize in the study of physical sciences and engineering but wish to further their studies in mathematics beyond the CE-level. The subject aims at developing students' mathematical and statistical knowledge and providing them with a tool for the study of some other subjects. On the other hand, AS-level Applied Mathematics is designed for S.6 & 7 students who intend to continue their studies in science, engineering and technology. It aims at developing students' mathematical skills in solving real-life problems and providing them with a foundation of mathematical knowledge and skills required in scientific and technological studies.

2.9 Both the A-level Pure Mathematics and A-level Applied Mathematics are for S.6 & 7 students intending to continue their studies in science, engineering and technology. Previous knowledge of Additional Mathematics would definitely be an advantage to students studying these subjects although it is not explicitly required. The main objectives of A-level Pure Mathematics include developing students' understanding of basic mathematical concepts and their ability to use basic logical patterns and conventions of reasoning, and extending their mathematical skills in problem solving. On the other hand, A-level Applied Mathematics aims at developing students' mathematical skills in solving problems in mechanics and real-life problems, and providing them with a foundation of mathematical knowledge required in scientific and technological studies. It should be noted that the objectives and the teaching approaches of the A-level Applied Mathematics and its AS-level counterpart have no significant difference. In fact, their main difference is only the content coverage. The content of the latter subject<sup>4</sup> is roughly half that of the former subject (mechanics is included in A-level Applied Mathematics but not in the AS-level counterpart), but the depth of treatment of both subjects remains more or less the same. A frequently voiced opinion by people is to eliminate one of the two subjects.

---

<sup>4</sup> Rearrangements have been made to bring the syllabus of the AS-level Applied Mathematics in line with that of the A-level Applied Mathematics so that corresponding parts in the two syllabuses are identical. The syllabus was implemented in September 1998.

## Revised Primary and Secondary Mathematics Syllabuses

2.10 Parallel with the holistic review of the mathematics curriculum, the Primary and Secondary Mathematics Syllabuses were being under revision with a view to updating the framework to meet the challenge of societal change and the advancement of technology. The draft curriculum document of the primary mathematics had already been sent to schools for consultation, but the revision of the Secondary Mathematics Syllabus had just started. We had expressed our views to the revised syllabuses. The draft curriculum document of the secondary mathematics was then issued to secondary schools for consultation in 1998. Positive feedback was obtained from both the consultations and the respective reports<sup>5</sup> were compiled.

2.11 To allow flexibility, the revised Secondary Mathematics Syllabus consists of foundation/non-foundation parts<sup>6</sup> and enrichment topics while the revised Primary Mathematics Syllabus foundation and enrichment topics. Moreover, spare periods are provided for consolidation or enrichment activities to suit the teaching approaches and the standard of students in individual schools.

2.12 The revised Primary Mathematics Syllabus was originally planned to implement at P.1 in September 2001. However, to avoid the mismatch in work schedule with the holistic review of the mathematics curriculum, the implementation date has been postponed to September 2002<sup>7</sup>. In this way, our recommendations will be properly considered and incorporated in the revised curriculum.

2.13 For the revised Secondary Mathematics Syllabus, major concerns in mathematics education, such as design of learning dimensions, catering for learner differences, enhancement of HOTs and use of IT in mathematics, have been incorporated. The revised

---

<sup>5</sup> The two reports are:

課程發展議會 (1997)。《小學數學科課程大綱初稿 (2001 年) 意見調查簡報》。香港：小學數學科科目委員會, and

CDC (1998) *Report on the Questionnaire on the Draft Framework of the Revised Mathematics Syllabus (S1-S5) for Secondary Schools*, Hong Kong: CDC Mathematics Subject Committee (Secondary).

<sup>6</sup> The foundation part of the syllabus is the essential part of the syllabus stressing the basic concepts, knowledge, properties and simple applications in real life situations. It represents the topics that all students should strive to master. The remaining topics of the syllabus constitute the non-foundation part of the syllabus.

<sup>7</sup> The implementation date was originally planned to be September 2003 by the Ad hoc Committee. But the former CDC advised the Ad hoc Committee in its meeting held on 23 April 1999 that it should be implemented one year earlier.

curriculum will be implemented in September 2001. Since the curriculum is developed in line with our recommendations, no further major review seems necessary.

### **Mathematics-Related Activities**

2.14 In HK, apart from the formal mathematics curriculum, mathematics-related activities play an important role in mathematics learning. We generally agree that well-chosen and organized mathematics-related activities should help to achieve the following objectives:

- (a) To encourage co-operation and team spirit.
- (b) To introduce new ideas and themes which are outside the existing mathematics curriculum.
- (c) To broaden the scope of students' knowledge and facilitate them to appreciate the power and beauty of mathematics and be aware of its daily life application.
- (d) To help students develop self-confidence, leadership and civic mindedness.
- (e) To help students consolidate and widen the foundation in mathematics.

2.15 In schools, particularly secondary schools<sup>8</sup>, Mathematics Club is usually established to co-ordinate the mathematics-related activities. The usual activities organized in schools include mathematical games, puzzles, mathematics trails, mathematics competitions/quizzes, mathematics workshops & projects, lectures, talks, film shows, book reviews, seminars, mathematics bulletin, tutorial classes, newspaper cutting and board display.

2.16 Apart from the mathematics-related activities organized within schools, both local and international activities are also held annually to promote students' interest in learning the subject. Local activities include Mathematics Trails, Mathematics Competition for Hong Kong Primary Schools, Hong Kong Primary Schools Mathematics Olympiad, HKMO, Poster Design Competition for HKMO, HKMO Mathematics Camp and Statistical Project Competition for Secondary School Students. International activities include Po Leung Kuk Primary Mathematics World Contest, Junior Mathematical Olympiad of China, Asian Pacific Mathematics Olympiad and IMO. However, it is found that students in HK seldom participate in mathematics-related activities.

---

<sup>8</sup> Mathematics Club is rarely established in primary schools. One of the possible reasons is that most of the primary schools are "half-day" schools. Teachers in either session do not have time and space to organize activities.