Annex VII

Primary School Mathematics

Requirements of Basic Academic Attainments

1. Basic Rationale

Mathematics is a science that studies quantitative relationships and spatial forms. In everyday life, numbers and shapes can be seen everywhere. The application and exploration on numbers and shapes is land in a very important circle of social and scientific development nowadays, which are conducive to cultivating students' interest in and habit of raising questions and thinking about them, as well as improving their creativity. Primary school mathematics curriculum should lay stress on the basic and practical aspects of the science; its contents should meet the needs of both establishing students' disciplinary foundation and development of the times in order to help students acquire the necessary knowledge and skills, and apply them in their daily life. The teaching process should place emphasis on developing students' thinking ability and improving their calculation and spatial imagination abilities while cultivating their basic logical reasoning and problem solving abilities, as well as their abilities to appreciate mathematics and helping them develop confidence and positive values through their experience in learning mathematics. To this end, the requirements of basic academic attainments of primary school Mathematics shall comply with the following basic rationale:

1) Mathematics is an indispensable part of human life and social development

Mathematics can help people understand and describe various phenomena systematically. It has provided a scientific language and a way of thinking for the development of other subjects. Therefore, it is an indispensable tool for human life and learning. Moreover, mathematics can enrich human intelligence by developing their abilities of calculation, spatial imagination, logical reasoning and problem-solving.

2) The mathematics curriculum should be student-oriented and lays stress on life practice

Mathematics derives from life and is widely applied to various aspects of social life. Therefore, the mathematics curriculum must be closely related to students' daily life; and

guide them to acquire the basic mathematical knowledge and skills. Furthermore, the curriculum should help students develop interest in learning mathematics, develop their awareness of applying mathematics, as well as promote their whole-person development through different learning and life experiences.

3) A good mathematical concept is conducive to students' mathematical development

Mathematics originates from the exploration of actual quantitative relationships and spatial shapes. Problems in the real world can be represented through mathematics. Mathematics is also a scientific language and a useful tool to understand the world and solve problems. Therefore, the mathematics curriculum should enable students to develop a mathematical concept of "What has been learned must be useful".

4) The teaching of mathematics should lay stress on students' learning process

The teaching process of mathematics should be based on students' existing knowledge and experience, so as to enable them to solve problems. The teaching of mathematics should stimulate students' learning motivation and promote their cognitive development through such experiential and participatory approaches as observation, operation, conjecture, estimation, analysis, reasoning and calculation.

2. Curriculum Goals

1) Develop students' basic mathematical knowledge, help them recognize the correlation between mathematics in daily life and that in the development of society; as well as know the importance of mathematics.

2) Develop students' basic mathematical skills, including being able to correctly use simple drawing and measuring tools, draw basic geometric shapes and make statistical graphs.

3) Develop students' necessary mathematical abilities such as calculation, spatial imagination, data processing and logical reasoning, and teach them to solve simple and practical problems encountered in daily life with mathematical knowledge.

4) Develop students' interest in learning mathematics, enable them to understand the

importance of mathematics, help them build confidence in learning mathematics.

5) Develop students' ability to communicate and discuss with others in the language of mathematics.

3. Requirements of Basic Academic Attainments in Various Areas

Explanation of coding:

1) The English capital letters refer to the domains of the requirements of basic academic attainments: A – "Number and arithmetic", B – "Shape and space", C – "Quantity and measurement", D – "Statistics and probability", E – "Basic knowledge of algebra", and F – "Feelings, attitudes and values";
2) The first number after the English capital letter refers to the serial number of the learning stages: 1 - Stage 1 (P1 to P3), 2 - Stage 2 (P4 to P6);
(3) The second number after the English letter refers to the serial number of the requirements of basic academic attainments in that learning scope.

Learning Scope A: Number and arithmetic

A－1－1	Be able to use numbers to represent things in life.
A－1－2	Be able to use numbers and arithmetic to solve simple problems encountered in life, and explain the actual meaning of the results.
A－1－3	Comprehend the meaning of cardinal number and ordinal number.
A－1－4	Be able to recognise, read and write numbers within 10,000, and make comparisons between numbers.
A－1－5	Comprehend the difference and relationship between place values and digits; know the counting unit in different places, and comprehend the composition of numbers.
A－1－6	Basically know fractions by combining specific situations, and be able to compare fractions with the same denominator and fractions with the same numerator.
A－1－7	Basically know decimal numbers by combining specific situations, and be able to compare numbers with one decimal place.
A－1－8	Comprehend the meaning of addition and subtraction by combining specific situations, and be able to perform addition and subtraction, the results of which are within 10,000.

A－1－9 Comprehend the meaning of multiplication by combining specific situations, and be able to multiply 1-digit numbers by 3-digit numbers and 2-digit numbers by 2-digit numbers.

A－1－10 Be able to use the commutative and associative properties of addition to perform simple calculation.

A－1－11 Comprehend the meaning of division by combining specific situations, and be able to divide 3-digit numbers by 1-digit numbers.

A－1－12 Comprehend the concept of divisibility, indivisibility, quotient and remainder.

A－1－13 Know the parentheses and be able to perform simple four operations with whole numbers.

A－1－14 Experience the process of estimation, and be able to select the appropriate unit to perform estimation by combining specific situations

A－1－15 Be fluent in performing oral addition and subtraction within 20, multiplication and division within the multiplication tables, as well as oral multiplication and division, the results of which are whole tens or whole hundreds.

A－1－16 Be able to perform, orally, addition and subtraction within 100, as well as multiplication and division of a two-digit number by a one-digit number.

A－2－1 Know numbers less than one hundred million and be able to compare the numbers.

A－2－2 Be able to multiply three-digit numbers by two-digit numbers.

A－2－3 Be able to divide three-digit numbers by two-digit numbers.

A－2－4 Know square brackets and be able to perform simple four operations with whole numbers.

A－2－5 Be able to distinguish odd numbers from even numbers, and distinguish prime numbers from composite numbers.

A－2－6 Comprehend the meaning of factors and multiples and their relationship.

A－2－7 Understand the common factors, common multiples, greatest common factor and least common multiple; be able to find the common factor(s) and the greatest common factor of two natural numbers that are within 100; be able to find the common multiple(s)

and the least common multiple of two natural numbers that are within 10.

A－2－8 Comprehend the meaning of decimal, fraction and percentage by combining specific situations, and be able to convert fractions to decimals and finite decimals to fractions.

A－2－9 Be able to compare decimals, fractions and percentages.

A－2－10 Basically know negative numbers.

A－2－11 Know the properties of the multiples of 2, 3 and 5.

A－2－12 Be able to perform all four operations with decimals.

A－2－13 Be able to perform all four operations with fractions.

A－2－14 Comprehend and master the commutative law, associative law and distributive law of multiplication, and be able to use the rules of mathematical operations to perform simple operations.

A－2－15 Be able to perform simple operations with whole numbers, fractions, decimals and percentages.

A－2－16 In specific situations, understand common quantitative relationships, such as Total Price = Unit Price × quantity, Distance = Speed × Time, and be able to solve simple practical problems.

A－2－17 Be able to solve simple practical problems involving decimals, fractions and percentages.

A－2－18 Be able to select the appropriate method of estimation when solving problems.

A－2－19 Comprehend the concept of scale, and be able to solve simple practical problems.

A－2－20 In actual situations, comprehend the meaning of ratio and distribution according to ratio, and be able to solve simple practical problems.

Learning Scope B: Shape and space

B－1－1 Understand lines and curves.

B－1－2 Basically know angles; be able to distinguish and draw right angles, acute angles and obtuse angles; be able to compare the sizes of angles.

B－1－3	Be able to distinguish such plane figures as triangles, squares, rectangles, parallelograms and circles; know the properties of the sides and angles of squares and rectangles through observation and operation.
B－1－4	Be able to use plane figures to form different shapes and patterns.
B－1－5	Comprehend the concept of the perimeter and area of plane figures by combining real life situations.
B－1－6	Be able to calculate the perimeter and area of rectangles and squares.
B－1－7	Be able to distinguish cylinders, cones and spheres.
B－1－8	Be able to describe the position of objects in relation to others by using “on top of/above”, “bottom/under”, “left”, “right”, “in front of” and “behind”.
B－1－9	Be able to identify the four directions of North, East, South and West; realise the four directions of South-East, North-East, South-West and North-West; be able to describe the direction of objects with these terms and be able to read simple road maps.
B－1－10	By combining real life situations, know the phenomena of translation and rotation, and know simple axially symmetric figures.
B－1－11	Be able to identify the shapes of simple objects observed from the front, side and top.
B－2－1	Be able to distinguish and draw straight lines, line segments and rays.
B－2－2	Comprehend the concept of perpendicularity and parallelism, and be able to draw perpendicular and parallel lines with drawing tools.
B－2－3	Comprehend the concept of angles; realise straight angles and round angles; be able to draw angles with drawing tools according to the given requirements.
B－2－4	Know the properties of the sides and angles of parallelograms, triangles and trapeziums through observation and operation.
B－2－5	Be able to calculate the perimeter and area of parallelograms, triangles and trapeziums.
B－2－6	Be able to calculate the area of simple compound shapes and other polygons.
B－2－7	Know the properties of circles and be able to draw circles with

compasses.

B－2－8 Be able to calculate the circumference and area of circles.

B－2－9 Comprehend the concept of volume by combining real life situations.

B－2－10 Know the properties of cuboids, cubes, cylinders and cones.

B－2－11 Be able to calculate the surface area and volume of cuboids, cubes and cylinders.

B－2－12 Be able to distinguish shapes with axial symmetry from shapes with rotational symmetry.

B－2－13 Be able to draw the symmetry axis of axially symmetric figures on graph paper, and complete a simple axially symmetric figure on graph paper.

B－2－14 Be able to use directions and distance to locate the position of objects, and be able to describe simple road maps.

B－2－15 Know scales and be able to use scales to solve practical problems.

B－2－16 Appreciate patterns in life from the perspective of translation, rotation and axial symmetry; be able to use them to create simple patterns on graph paper.

B－2－17 Be able to reduce and enlarge shapes according to the scale given.

B－2－18 In specific situations, be able to use whole number ordered pairs to show the position of objects on graph paper.

Learning Scope C: Quantity and measurement

C－1－1 Be able to use appropriate measurement units to represent different things in life.

C－1－2 Be able to use appropriate measurement tools to measure different things in life.

C－1－3 Know the legal currency of Macao and be able to convert “dollar” to “cents”, and vice versa.

C－1－4 Experience and know the length units: “millimetre”, “centimetre”, “decimetre”, “metre” and “kilometre”; and perform simple conversion between these units.

C－1－5 Experience and know the weight units: “gram”, “kilogram” and “ton”; and perform simple conversion between these units.

C－1－6 Experience and know the area units: “square centimetres”, “square decimetres” and “square metres”; and perform simple conversion between these units.

C－1－7 Experience the length of time by combining life experiences; know clocks and watches as well as the time units: “year”, “month”, “week”, “day”, “hour”, “minute” and “second”; and be able to perform simple conversion between these units.

C－1－8 Be able to indicate time in both 12-hour and 24-hour formats.

C－2－1 Know the area unit of “square kilometers”.

C－2－2 Experience and know the volume units: “cubic centimetres”, “cubic decimetres” and “cubic metres”, and perform simple conversion between these units.

C－2－3 Experience and know the capacity units of “millilitre” and “litre”, and perform simple conversion between these units.

C－2－4 Comprehend the relationship between capacity and volume and be able to perform simple conversion between them.

C－2－5 Know that angles are measured in “degrees” and be able to measure angles with a protractor.

C－2－6 Comprehend the concept of “horizontal” and “vertical”, and be able to perform simple measurement.

C－2－7 Be able to measure and estimate quantities in life.

Learning Scope D: Statistics and probability

D－1－1 Be able to collect and sort information for simple problems in real life.

D－1－2 Know and be able to draw bar charts.

D－1－3 Be able to judge the certainty and uncertainty of the occurrence of events.

D－2－1 Collect information from media such as newspapers and periodicals, books, TV programmes and the Internet.

D－2－2 Be able to sort out information and make simple statistical tables.

D－2－3 Know and be able to make line charts and pie charts.

D－2－4 Know and be able to make compound bar charts and compound line charts.

D－2－5	Be able to choose bar chart, line chart or pie chart to present data in a straightforward and efficient manner.
D－2－6	Comprehend the meaning of mean and be able to calculate the mean of the numbers given.
D－2－7	Be able to analyse, predict and discuss statistical results.
D－2－8	Be able to determine the possibility of the occurrence of an event according to information given.

Learning Scope E: Basic knowledge of algebra

E－1－1	Comprehend the concept of the transitive property of equality by combining specific situations.
E－2－1	Comprehend the meaning of using letters to represent numbers.
E－2－2	Comprehend the meaning of equation.
E－2－3	Be able to express equality in simple circumstances with equations.
E－2－4	Be able to solve linear equations in one variable.
E－2－5	Know directly proportional quantities and inversely proportional quantities through specific situations; be able to identity real life examples of direct proportion and inverse proportion as well as exchange the examples with others.

Learning Scope F: Feelings, attitudes and values

F－1－1	Enjoy participating in mathematics learning activities and show positive attitudes.
F－1－2	Feel the connection between mathematics and life by combining specific life situations.
F－1－3	Be able to exchange with others during mathematical activities; learn to listen to and respect others' views.
F－1－4	Experience the beauty of mathematics by combining life situations.
F－2－1	Enjoy participating in exploring mathematical problems; experience the exploratory and creative features of mathematics.
F－2－2	Understand the close relation between mathematics and daily life through the learning process of observation, operation, generalisation and deduction, etc.
F－2－3	Respect and accept other's ways of solving mathematical problems during exchange, and be able to try different solutions.

F－2－4 Be able to confront and solve the difficulties encountered in mathematical practice activities.

F－2－5 Be able to use the language of mathematics to express the process of thinking, and experience the rigourousness and formal beauty of mathematics.

F－2－6 Evaluate and question different viewpoints during exchange, and to express their own views with confidence.