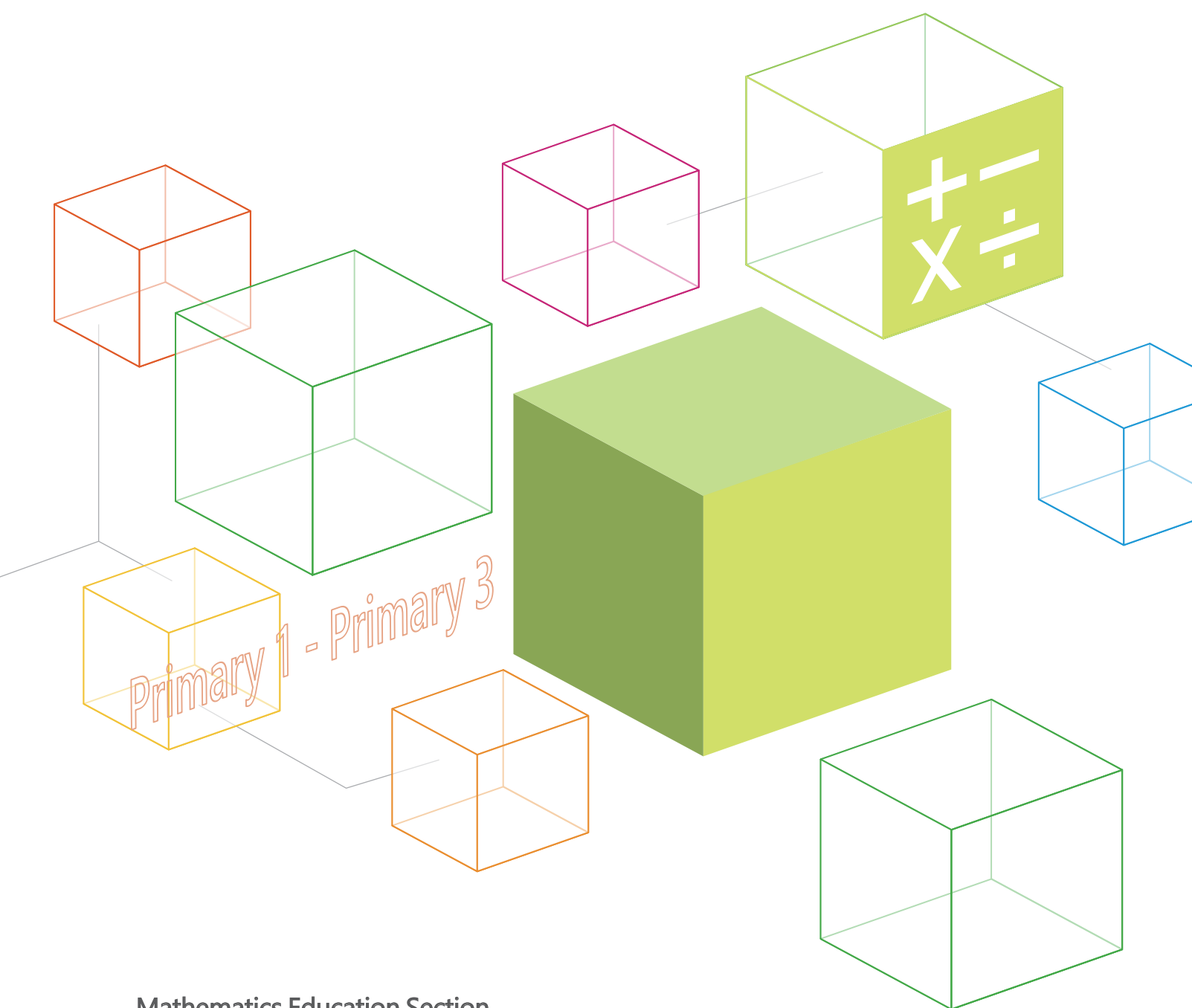


# Explanatory Notes to Primary Mathematics Curriculum (Key Stage 1)



Mathematics Education Section  
Curriculum Development Institute  
Education Bureau  
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## Foreword

To keep abreast of the ongoing renewal of school curriculum at primary and secondary levels, the revised *Mathematics Education Key Learning Area Curriculum Guide (Primary 1 - Secondary 6)* (2017) and its supplements setting out the learning content at each key stage have been prepared by the Curriculum Development Council and released in late 2017. Among these documents, the *Supplement to Mathematics Education Key Learning Area Curriculum Guide: Learning Content of Primary Mathematics (2017)* (hereafter referred to as “*Supplement*”) aims at elucidating in detail the learning targets and content of the revised primary Mathematics curriculum.

In the *Supplement*, the Learning Objectives of the primary Mathematics curriculum are grouped under different Learning Units in the form of a table. The notes in the “Remarks” column of the table provide supplementary information about the Learning Objectives.

The explanatory notes in this booklet aim at further explicating:

1. the requirements of the Learning Objectives of primary Mathematics curriculum;
2. the strategies suggested for the teaching of primary Mathematics curriculum;
3. the connections and structures among different Learning Units of primary Mathematics curriculum; and
4. the curriculum articulation between the primary Mathematics and the junior secondary Mathematics.

Teachers may refer to the “Remarks” column and the suggested lesson time of each Learning Unit in the *Supplement*, with the explanatory notes in this booklet being a supplementary reference, for planning the breadth and depth of treatment in learning and teaching. Teachers are advised to teach the content of the primary Mathematics as a connected body of mathematical knowledge and develop in students the capability for using mathematics to solve problems, reason and communicate. Furthermore, it should be noted that the ordering of the Learning Units and Learning Objectives in the *Supplement* does not represent a prescribed sequence of learning and teaching. Teachers may arrange the learning content in any logical sequences which take account of the needs of their students.

Comments and suggestions on this booklet are most welcomed. They may be sent to:

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| Learning Unit               | Learning Objective                                                                                                                                                                                                                                                                                                                                 | Time |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>        |                                                                                                                                                                                                                                                                                                                                                    |      |
| <b>1N1</b><br>Numbers to 20 | <ol style="list-style-type: none"> <li>1. recognise numbers 1-20</li> <li>2. perform counting onwards and counting backwards</li> <li>3. recognise the concepts of ordinal numbers and cardinal numbers</li> <li>4. recognise the odd and even numbers up to 20</li> <li>5. recognise the decomposition and composition of numbers 2-18</li> </ol> | 13.5 |

### **Explanatory Notes:**

Students are required to read and write the numerals representing the numbers 1-20, to count a group of not more than 20 objects, and to take out a prescribed quantity (not more than 20) of objects from a group of objects.

When performing counting onwards from a number, students have to start from the given number to a larger number in equal steps. Conversely, when performing counting backwards from a number, they have to start from the given number to a smaller number in equal steps. In this learning unit, students are only required to perform counting by 1.

Students should recognise the concepts of ordinal numbers and cardinal numbers, which mean using numerals to indicate respectively the sequence of events or the order of the arrangement of objects and the quantities of objects. Although teachers may use the terms “ordinal numbers” or “cardinal numbers” in their explanation, the curriculum does not require students to use these terms.

Students are required to compare the quantities of two groups of objects (Groups A and B), e.g. by using the method of one-to-one correspondence or by counting the numbers of objects in each group, and use sentences “Group A has more objects than Group B” and “Group B has less objects than Group A” to present the result of comparison. Besides, students should recognise the magnitude of numbers (5 is greater than 3) through the result of comparing the quantities of two groups of objects (a group of 5 books has more books than a group of 3 books). In Primary One, students are not required to use the symbols “>” and “<” to record the comparison result, and they are also not required to explicate the result such as Group A has 2 books less than that of Group B, as it is the learning content of Learning Unit 1N2 “Basic

addition and subtraction”.

Teachers may make use of those activities that are related to students' daily experience as examples to let students recognise the odd and even numbers up to 20, e.g. to discuss the situation when a class of students walking hand in hand in groups of 2.

Recognising the composition and decomposition of numbers not only helps students learn the concepts of addition and subtraction in Learning Unit 1N2 “Basic addition and subtraction”, but also constitutes the foundation knowledge for performing addition with carrying and subtraction with borrowing in the future. The Learning Objective 5 only requires students to compose a number from two 1-digit numbers and decompose a number into two 1-digit numbers. For example, 4 and 8 make 12 ( $4+8=12$ ); and 12 is 4 and 8 ( $12=4+8$ ).

Teachers should arrange hands-on activities to let students familiarise with the composition and decomposition of numbers 2-18 and use various daily life examples to demonstrate their applications. For example, students make use of the fact that 12 is 4 and 8 to understand if 8 dots out of 12 dots are covered, only 4 dots can be seen (i.e. 12 minus 8 equals 4;  $12-8=4$ ). Students are required to present the result verbally first and then use text and symbols “+”, “-” and “=” to record them, in which the terms “addition sign”, “subtraction sign” and “equal sign” are required, but the symbols “+”, “-” and “=” here are not used for calculation purpose.

Examples of vocabularies to be learnt: more than , less than , greater than, smaller than, counting onwards, counting backwards, even number, odd number, the first, the second, the third, ... , the twentieth, plus, minus, equals, addition sign, subtraction sign, equal sign, etc.

| Learning Unit                                | Learning Objective                                                                                                                                                                                                                                                                     | Time |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>                         |                                                                                                                                                                                                                                                                                        |      |
| <b>1N2</b><br>Basic addition and subtraction | 1. understand the basic concepts of addition and subtraction<br>2. perform addition and subtraction of numbers within 18 verbally<br>3. recognise the concept of 0<br>4. understand the relation between addition and subtraction<br>5. recognise the commutative property of addition | 13.5 |

### **Explanatory Notes:**

In Learning Unit 1N1 "Number to 20", students recognised the decomposition and composition of numbers 2-18. In this learning unit, students are required to use the concepts of decomposition and composition to learn the basic concepts of addition and subtraction. The concepts associated with addition include merging and adding, while those with subtraction include taking away and comparing, etc. Teachers should use daily life examples to explain the various concepts associated with addition and subtraction to students. Students are required to recognise that the terms “sum” and “difference” denote respectively the results of addition and subtraction.

In this learning unit, students are only required to solve the problems presented mainly by diagrams. Teachers should let students verbally solve the problems before recording their work in horizontal form. The related problems only involved addition and subtraction of those decomposition and composition number pairs within 18 which students learnt in 1N1. That means operations such as  $12+5$  and  $17-5$  are not required. In this learning unit students are not required to learn the column form of addition and subtraction, which is the learning content of Learning Unit 1N4 “Addition and subtraction (I)”.

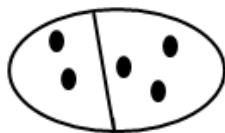
The concept of 0 is relatively abstract. Teachers should use daily life examples of subtraction to explain the concept of 0 to students. For example, there are 4 books on the desk. If all books are taken away and no books are left on the desk, it means there are 0 books on the desk. Apart from the concept of 0, students are required to recognise the properties of 0. Teachers should use concrete examples to let students recognise that 0 plus any number or any number plus 0 equals that number; and, any number minus 0 is that number while any number minus itself is 0.

Students are required to recognise the relation between addition and subtraction in this learning unit. This provides the foundation for recognising how to verify the result of subtraction by using addition in the future. As the objective is not for drilling of calculation, the numbers involved in the related exploratory activities should be within 10, e.g.

$$2+3 = 5$$

$$5-2 = 3$$

$$5-3 = 2$$



Teachers may make use of students' daily life experience to let them discover the facts such as  $5+4 = 4+5$ . That is to say, commutative property holds for addition. For example, no matter whether mother first gives you 5 books and then gives you another 4 books, or mother first gives you 4 books and then gives you another 5 books, the total number of books you get from mother is the same. Teachers may also provide students with examples with contexts to enable them to discover that commutative property does not hold for subtraction. For example, if there are 5 books on the desk and Ann takes 2 away, then 3 books were left, whereas if there are 2 books on the desk, Ann cannot take 5 from it. It means  $5-2$  does not equal  $2-5$ .

Although teachers may use the term “commutative property” in their explanation, the curriculum does not require students to use this term. This is because the curriculum focuses on students' ability to make use of the properties of operations in a flexible way during calculations, rather than on their recollection or the rote learning of the names of properties.

Examples of vocabularies to be learnt: total, take away, remaining, addition, subtraction, sum, difference, horizontal form, etc.

| Learning Unit                | Learning Objective                                                                                                                                                                                                                                                                                     | Time |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>         |                                                                                                                                                                                                                                                                                                        |      |
| <b>1N3</b><br>Numbers to 100 | <ol style="list-style-type: none"> <li>1. recognise numbers 21-100</li> <li>2. recognise the concepts of the units place and the tens place</li> <li>3. compare the magnitude of numbers</li> <li>4. perform counting in groups of 2, 5 and 10</li> <li>5. estimate the quantity of objects</li> </ol> | 6    |

### Explanatory Notes:

Similar to the learning of numbers within 20, students are required to recognise the numerals representing the numbers from 21 to 100 by counting, reading and writing.

Students are required to recognise the meaning of the numerals in the units place and the tens place. For example, in the numeral “24”, “2” is in the tens place and stands for 20 while “4” is in the units place and stands for 4. Teachers do not need to introduce the term “place value”.

In Learning Unit 1N1 “Numbers within 20”, students recognised that 1,3,5,7,9, ... 19 are odd numbers, and 2,4,6,8, ... 20 are even numbers. At this stage, teachers can let students recognise 0 is an even number by counting backwards from some even numbers, e.g. 8,6,4,2,0, and also recognise how to determine whether a 2-digit number is an odd number or an even number by checking the numeral in its units place. If it denotes an odd number, this 2-digit number is an odd number. If it denotes an even number, this 2-digit number is an even number.

Students should extend the strategy for comparing the magnitude of two numbers to comparing the magnitude of a group of numbers, arranging them in ascending order or descending order. The symbols “<” and “>” will be introduced in Learning Unit 2N1 “3-digit numbers”

Students are required to count the number of objects of quantity less than 100 in groups of 2, 5 and 10, in which calculation is not required. Students can use this counting method to count the value of a group of coins and the time that the minute hand shows on a clock in the future. After students have gained sufficient experience in counting and mastered the skills of counting, teachers should teach students how to estimate the numbers of objects by, for

example, setting up some reference quantities for estimation. The quantity to be used for estimation should be less than 100.

Examples of vocabularies to be learnt: units place, tens place, the largest, the smallest, estimation, etc.

| Learning Unit                              | Learning Objective                                                                                                                                                                                                                                                                                                                               | Time |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>                       |                                                                                                                                                                                                                                                                                                                                                  |      |
| <b>1N4</b><br>Addition and subtraction (I) | <ol style="list-style-type: none"> <li>1. perform addition of two numbers</li> <li>2. perform addition of three numbers</li> <li>3. recognise the associative property of addition</li> <li>4. perform subtraction of two numbers</li> <li>5. recognise the column form of addition and subtraction</li> <li>6. solve simple problems</li> </ol> | 13   |

### Explanatory Notes:

In this learning unit, students are required to perform addition of two numbers, addition of three numbers, and subtraction of two numbers, in which the numbers involved are up to two digits. Addition includes carrying, but subtraction doesn't include borrowing. At this stage, students have not recognised the concept of hundreds place and the results of the addition should therefore be less than 100.

In this learning unit, students are required to recognise the column form of both addition and subtraction. Teachers should let students understand why column form should be in place when calculating addition and subtraction by using the concepts of the units place and the tens place. While performing the addition in column form, teachers can let students use some marks to indicate the number carrying to the tens column. However, this is for helping those students who need to remember the number carrying and not a method that all students must adopt.

In Learning Unit 1N2 “Basic addition and subtraction”, students recognised the relation between addition and subtraction. In this unit, they will recognise how to use this relation to verify the result of subtraction by addition.

Students should recognise that the conventional order of performing addition of three numbers goes from left to right, e.g.  $10+6+2 = 16+2 = 18$ . Teachers may provide students with examples with contexts to enable them to discover the associative property of addition, and design some concrete examples to let students understand that using the associative property of addition can speed up the calculations, so as to motivate their learning interest. Although teachers may use the term “associative property” in their explanation, the curriculum does not require students to use this term.

In Learning Unit 1N2 “Basic addition and subtraction”, students solved the problems presented mainly by diagrams. In this learning unit, the problem type will be extended to simple word problems, but it only involves addition or subtraction of two numbers. Problems involving addition of three numbers are tackled in Learning Unit 2N2 “Addition and subtraction (II)”. At this stage, students are not required to explain their calculation with statements.

Examples of vocabularies to be learnt: 1-digit number, 2-digit number, in place, carrying, column form, etc.

| Learning Unit                            | Learning Objective                                                                                                                                                                                                                                                                                                                                          | Time |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b>                   |                                                                                                                                                                                                                                                                                                                                                             |      |
| <b>1M1</b><br>Length and distance<br>(I) | 1. recognise the concepts of length and distance<br>2. compare intuitively the lengths of objects and compare intuitively the distances between objects<br>3. compare directly the lengths of objects and compare directly the distances between objects<br>4. compare the lengths of objects and compare the distances between objects in improvised units | 3.5  |

### Explanatory Notes:

In this learning unit, students are required to recognise the concepts of length and distance by intuitive comparison, direct comparison and comparison in improvised units. Students are required to understand that they can obtain the comparison results by observation or by tools.

Teachers should introduce the concepts of length and distance in some contexts that students are familiar with, e.g. lining up from the tallest to the shortest.

In Learning Objective 2, students are required to compare the length of objects intuitively. Teachers should select objects with significant differences in lengths to help students to achieve the learning objective. Students are required to recognise the distance between two objects is the straight distance between them and they should distinguish between distance and route.

Teachers should guide students to recognise the points to note when comparing the lengths of objects directly. For example, the end points of two objects must be aligned.

Students are required to choose appropriate improvised units for taking measurements in particular situations. They are also required to compare the lengths of curve or some curvy parts of objects, such as ropes. Teachers should not ask students to arrange many objects by length at the same time.

Examples of vocabularies to be learnt: length, distance, long, short, tall, wide, narrow, thick, thin, far and near, etc.

| Learning Unit           | Learning Objective                                                                                                                                              | Time |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b>  |                                                                                                                                                                 |      |
| <b>1M2</b><br>Money (I) | 1. recognise the coins in circulation in Hong Kong<br>2. recognise the notation of marked prices from price tags<br>3. recognise the use of coins in daily life | 6    |

### Explanatory Notes:

Nowadays, students may have only little experience in using cash in daily life. Teachers should adopt various activities to help students recognise the coins in circulation in Hong Kong, e.g. observing the colour and the shape, finding the patterns, words and numbers being carved, and comparing the size, thickness and weight of coins.

Students should recognise the notation of marked prices from price tags, e.g. to read the marked price such as “\$2.50” as “two dollars and fifty cents”. Students are only required to read marked prices not more than 10 dollars and teachers are not required to mention the place value of decimal numbers. Students are not required to write marked prices. However, teachers should write the marked prices in the form such as “\$3.00”.

Students should recognise the use of coins in daily life. It includes counting a group of coins with a total not more than 10 dollars. However, students are not required to write numerical expressions to show the working. Students are only required to do following exchange:

- (1) the exchange involving only 10-cent, 20-cent, 50-cent and 1-dollar coins. For example, five 20-cent coins can be exchanged for one 1-dollar coin.
- (2) the exchange involving only 1-dollar, 2-dollar, 5-dollar and 10-dollar coins. For example, one 10-dollar coin can be exchanged for one 5-dollar coin, two 2-dollar coins and one 1-dollar coin.

Students are not required to do exchange between the coins across group (1) and group (2), e.g. exchanging one 5-dollar coin for ten 50-cent coins is not required.

Problems on giving change are tackled in Learning Unit 2N5 “Addition and subtraction (III)”. For example, what is the change if you pay 10 dollars for an onion that costs 6 dollars 50 cents?

Examples of vocabularies to be learnt: coin, dollar, cent, buy, sell, cheap, expensive, etc.

| Learning Unit                             | Learning Objective                                                                                                                                                                                                         | Time |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b>                    |                                                                                                                                                                                                                            |      |
| <b>1M3</b><br>Length and distance<br>(II) | 1. recognise centimetre (cm)<br>2. measure and compare the lengths of objects, and measure and compare the distances between objects in centimetre<br>3. estimate the result of measurements with <b>ever-ready rulers</b> | 4    |

### Explanatory Notes:

Students have learnt how to compare the lengths of objects and the distances between objects by intuitive comparison, direct comparison and comparison in improvised units. Teachers should help students understand the need for using standard unit through activities.

After introducing the standard unit centimetre (cm), teacher should help students recognise centimetre through various activities. Teachers should teach students the skill on using rulers, e.g. aligning one end of the object with the mark “0” on the ruler, noting the marking of starting point and end point of the object on the ruler, etc. Students are required to select appropriate tools for taking measurement in particular situations.

Students are required to estimate the result of measurements with ever-ready rulers, such as thumb width, length of foot and span, and understand the points to note when using ever-ready rulers. After students have acquired the experience of measurements, teachers should teach them how to estimate the result of measurements and encourage them to estimate the result before measuring.

Examples of vocabularies to be learnt: centimetre (cm), centimetre ruler, tape measure, ever-ready ruler, etc.

| Learning Unit          | Learning Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Time |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| <b>1M4</b><br>Time (I) | <ol style="list-style-type: none"> <li>1. tell time to the hour and half hour</li> <li>2. recognise hour (h)</li> <li>3. measure and compare the time intervals in hour</li> <li>4. solve simple problems related to time intervals</li> <li>5. recognise that there are seven days in a week and the names of the days of the week</li> <li>6. recognise that there are 12 months in a year and the names of the months</li> <li>7. recognise calendars</li> </ol> | 6    |

### Explanatory Notes:

In preparing students to grasp the contents of telling time and time intervals, teachers should help students recognise the clock face of an analogue clock through their life experience first.

Students are only required to tell time from analogue clocks using “...o’clock” and “half past...”. Drawing hour hands and minute hands to indicate time is not required. Students are not required to tell time such as “a little after half past nine” and “nearly nine o’clock”.

After introducing the concepts of 1 hour, 2 hours, ... and 12 hours, teachers should help students establish the sense of one hour through activities, e.g. asking students to record the number of pages of a book they can read in one hour.

Students are required to use clocks or stopwatches to measure and compare the time intervals in hours. Each time interval in the measurement must be a whole number, and is not more than 12 hours. Teachers should help students recognise the concepts of quicker and slower by time intervals.

Students are only required to solve the following two types of simple problems: finding the finishing time from the starting time and time interval; finding the time interval from the starting time and finishing time. All time intervals involved must be whole numbers, and not more than 12 hours. For example, Eric goes to bed at half past nine and wakes up after 10 hours. When does he wake up?

Students are required to recognise that there are seven days in a week and the names of the

days of the week. Teachers do not need to stress whether Monday or Sunday is the first day of the week. Students are required to recognise that there are 12 months in a year and the names of the months. They also need to know that there are about 4 weeks in a month. Students are required to recognise calendars and get information on dates and the days of the week from a calendar.

Examples of vocabularies to be learnt: ...o'clock, half past..., hour hand, minute hand, hour, year, month, day, the days of the week, etc.

| Learning Unit                 | Learning Objective                                                                    | Time |
|-------------------------------|---------------------------------------------------------------------------------------|------|
| <b>Shape and Space Strand</b> |                                                                                       |      |
| <b>1S1</b><br>3-D shapes (I)  | 1. recognise the intuitive concepts of prisms, cylinders, pyramids, cones and spheres | 6    |

### **Explanatory Notes:**

At the primary level, the starting point for learning the content in Shape and Space Strand is recognising 3-D shapes, as the objects that students come across in their daily life are 3-D objects.

Teachers should provide opportunities for students to touch, stack up, roll and observe real objects or models of some 3-D shapes, in order to help students build up the intuitive concepts of prisms, cylinders, pyramids, cones and spheres.

To enable students to identify 3-D shapes intuitively from their 2-D representation, teachers may provide pictures of the real objects for students to outline the shape of these 3-D shapes, so as to help them connect the 3-D shapes with their 2-D representations.

Teachers should avoid using oblique 3-D shapes such as oblique prisms and oblique cones as examples and need not require students to make a 3-D shapes or recognise the names of different prisms and pyramids. These are respectively the learning contents of Learning Units 5S2 “3-D shapes (III)” and 2S1 “3-D shapes (II)”.

Examples of vocabularies to be learnt: 3-D shape, prism, pyramid, cylinder, cone, sphere, etc.

| Learning Unit                 | Learning Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Time |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Shape and Space Strand</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
| <b>1S2</b><br>2-D shapes      | <ol style="list-style-type: none"> <li>1. recognise the intuitive concepts of points, straight lines and curves</li> <li>2. draw and make straight lines and curves</li> <li>3. recognise the basic concepts of triangles, quadrilaterals, pentagons, hexagons and circles</li> <li>4. draw and make triangles, quadrilaterals, pentagons, hexagons and circles</li> <li>5. form 2-D shapes by triangles, quadrilaterals, pentagons, hexagons and circles</li> </ol> | 10   |

### Explanatory Notes:

Students are only required to recognise the intuitive concepts of points, straight lines and curves and to identify straight lines and curves intuitively. Teachers may arrange hands-on activities for students to consolidate their conception of straight lines and curves, e.g. the activity of arranging cubes one by one.

Students should recognise that in mathematics, a point has no size. Dots and crosses are daily life symbols commonly used to represent points. The symbols drawn may be different in size, but they only represent the locations of the points which have no size. In mathematics, there is only one straight line passing through two points, however, there are many different curves passing through these two points. Students should recognise that a line has no breadth. Even though students may draw lines with different breadths passing through two fixed points, they represent the same straight line in mathematics. All these mathematical knowledge will be useful for students to grasp the concepts of distance, line segment, centre, and radius, etc.

Teachers may let students use different methods to draw and make straight lines and curves, e.g. tracing the outline of daily life items such as a cup, a book, etc. to draw curves and straight lines, and to use cotton strings to make straight lines and curves.

Students should recognise the basic concepts of triangles, quadrilaterals, pentagons, hexagons and circles. For example, quadrilaterals are formed with four straight lines connected end to end on a plane (the concept of line segments is the learning content of Learning Unit 2S4 “Quadrilaterals (II)”). At the primary level, students are only required to deal with simple shapes. They are not required to recognise the quadrilaterals like . Students may identify

the type of a 2-D shape by counting its number of sides. The shapes can be convex polygons or concave polygons, but teachers do not have to introduce the concepts of convex polygons and concave polygons to students. Teachers may let students use different methods to draw, different tools or different materials to make 2-D shapes.

Teachers may let students freely create 2-D shapes or request them to form certain 2-D shapes. Apart from letting students know that the type of a shape remains the same even though its orientation changes, students may also appreciate the beauty of geometric shapes as well.

Examples of vocabularies to be learnt: point, straight line, curve, 2-D shape, triangle, quadrilateral, pentagon, hexagon, circle, etc.

| Learning Unit                              | Learning Objective                                                                                                                                                    | Time |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Shape and Space Strand</b>              |                                                                                                                                                                       |      |
| <b>1S3</b><br>Directions and positions (I) | 1. use “over”, “under”, “left”, “right”, “in front of”, “behind” and “between” to describe relative positions of objects with respect to the observer’s point of view | 3.5  |

### **Explanatory Notes:**

In this learning unit, students are required to use “over”, “under”, “left”, “right”, “in front of”, “behind” and “between” to describe relative positions of objects with respect to the observer’s point of view. Teachers should provide students with hands-on activities to enable them to use these terms to describe the relative positions of objects around them.

Students are also required to use “over”, “under”, “left”, “right”, “in front of”, “behind” and “between” to describe the relative positions of objects in the pictures:

- relative position left and right

Students are only required to describe the position of an object in a picture from their own point of view by using phrases “\_\_\_\_\_ on the left” or “\_\_\_\_\_ on the right”.

- relative position over and under, in front of and behind

Students are required to use the sentence “\_\_\_\_ is over/under/in front of/ behind\_\_\_\_” to describe the relative positions of objects.

As this is a learning unit in Primary One, solving problems involving complicated relative positions is not required. The information of the picture should be simple.

Examples of vocabularies to be learnt: position, over, under, left, right, in front of, behind, between, etc.

| Learning Unit                           | Learning Objective                                                                                                                                                         | Time |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Further Learning Unit</b>            |                                                                                                                                                                            |      |
| <b>1F1</b><br>Inquiry and investigation | Through various learning activities, discover and construct knowledge, further improve the ability to inquire, communicate, reason and conceptualise mathematical concepts | 10   |

**Explanatory Notes:**

This Learning Unit aims at providing students with more opportunities to engage in the activities that avail themselves of discovering and constructing knowledge, further improving their abilities to inquire, communicate, reason and conceptualise mathematical concepts when studying other Learning Units. In other words, this is not an independent and isolated learning unit and the activities may be conducted in different stages of a lesson, such as motivation, development, consolidation or assessment.

| Learning Unit                 | Learning Objective                                                                                                                                                                                                  | Time |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>          |                                                                                                                                                                                                                     |      |
| <b>2N1</b><br>3-digit numbers | 1. recognise 3-digit numbers<br>2. recognise the concept of the hundreds place<br>3. compare the magnitude of numbers<br>4. perform counting in groups of 20, 25, 50 and 100<br>5. estimate the quantity of objects | 3.5  |

### **Explanatory Notes:**

In Primary One, students recognised the numbers within 100 and the meaning of the numerals in the units place and in the tens place. In this learning unit, students are required to recognise the concepts of 3-digit numbers and the hundreds place.

Students are required to recognise that ten tens are a hundred and the value represented by the numeral in the hundreds place. Also, they have to read and write the numerals that represent 3-digit numbers by integrating the concepts of units place and tens place, and to count the number (must be a 3-digit number) of objects. For example, when counting the number of cubes: one cube represents a unit, ten cubes form one long rod which represents a ten, and ten long rods form one plate which represents a hundred.

Students are required to recognise how to determine whether a 3-digit number is an odd or even number by checking the numeral in its units place. In this learning unit, students are required to use the symbols “=”, “>” and “<” to express the relation between the magnitude of two numbers. Teachers should let students verbally report the comparison result, e.g. “223 is greater than 124, and 124 is greater than 56”, and then let students use the symbols  $223 > 124 > 56$  to record them.

In Primary One, students recognised how to count the number of objects in groups of 2, 5 and 10. In this learning unit, they are required to perform counting in groups of 20, 25, 50 and 100, in which calculation is not involved. When students have gained sufficient counting experience, teachers should encourage them to estimate before perform counting. The quantity to be used for estimation should be less than 1000.

Examples of vocabularies to be learnt: 3-digit number, hundreds place, greater than, less than, etc.

| Learning Unit                               | Learning Objective                                                                                                                                                                                                      | Time |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>                        |                                                                                                                                                                                                                         |      |
| <b>2N2</b><br>Addition and subtraction (II) | 1. perform addition of not more than three numbers<br>2. perform addition by using the commutative and associative properties of addition<br>3. perform subtraction of not more than three numbers<br>4. solve problems | 7    |

### Explanatory Notes:

In Primary One, students performed the addition (including carrying) of not more than three numbers which are of at most two digits. In this learning unit, the addition (including carrying) will be extended to not more than three numbers which are of at most three digits, and the result must be less than 1000.

In Primary One, students recognised the commutative and associative properties of addition. In this learning unit, teachers may design some concrete examples to let students understand that flexible use of these two properties can speed up the calculations, so as to motivate their learning in mathematics. For example,

$$\begin{aligned}
& 399+65+1 \\
& = 65+399+1 \\
& = 65+400 \\
& = 465
\end{aligned}$$

Although teachers may use the terms “associative property” and “commutative property” in their explanation, the curriculum does not require students to use these terms.

In this learning unit, subtraction will be extended from subtraction (not including borrowing) of two numbers which are up to two digits in Primary One to subtraction (including borrowing) of not more than three numbers which are at most two digits. Students should recognise that the conventional order of performing subtraction of three numbers goes from left to right, e.g.  $10-7-2 = 3-2 = 1$ .

In Primary One, students recognised that the commutative property does not hold for subtraction. In this learning unit, teachers may provide students with concrete examples to enable them to discover the associative property does not hold for subtraction neither, e.g.

$10-7-2$  does not equal  $10-5$ . Although teachers may use the term “associative property” in their explanation, the curriculum does not require students to use this term.

In this learning unit, students are required to explain their calculation with statements. Teachers should use contexts related to students’ daily life experience as examples to foster their interest in learning mathematics. Problems involving both “more (less) than” and “altogether” are tackled in Learning Unit 3N4, e.g. “Andy has 10 pieces of candy and he has 2 pieces less than that of Betty. How many pieces of candy do they have altogether?”

After students have mastered the skills of performing addition with carrying and subtraction with borrowing, teachers should teach them how to estimate the results of calculations so as to let them understand the advantages of estimation and enhance the effectiveness of learning.

Examples of vocabularies to be learnt: borrowing, etc.

| Learning Unit                      | Learning Objective                                                                                                                                                                                                   | Time |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>               |                                                                                                                                                                                                                      |      |
| <b>2N3</b><br>Basic multiplication | 1. recognise the basic concept of multiplication<br>2. understand the multiplication table (0-10)<br>3. perform basic multiplication<br>4. recognise the commutative property of multiplication<br>5. solve problems | 11.5 |

### Explanatory Notes:

Students are required to recognise that the basic concept of multiplication is repeated addition. Since students have already learnt how to count in groups of 2, 5 and 10 in Primary One, teachers may start with the multiplication of 2, 5 and 10, and let students understand the multiplication table of 2, 5, 10 by means of hands-on counting activities.

A multiple can be written on the left side or right side of the multiplication sign. For example, if we use “2 groups of 3 is 6” to represent the quantity of black dots below, the multiplication can be expressed as “ $3 \times 2 = 6$ ” or “ $2 \times 3 = 6$ ”. If the basic concept of multiplication and repeated addition are linked, we have  $3+3 = 3 \times 2$  or  $3+3 = 2 \times 3$ .



To avoid students' confusion about the two ways of expressing multiplication, teachers may first select one expression of multiplication to let students recognise the concept of multiplication. After students have recognised the associative property of multiplication, teachers may explain to students that both expressions are correct. That is to say, the multiple can be written on the left side or right side of the multiplication sign.

Teachers may provide students with examples with contexts to enable them to discover the commutative property of multiplication. Although teachers may use the term "commutative property" in their explanation, the curriculum does not require students to use this term.

Students should first compile the multiplication table of 2-10, then compile the multiplication table of 1 and 0. Students are required to recognise that:

- any number times 1 equals that number

- any number times zero equals zero

Students may use “ $3 \times 2$ ” or “ $2 \times 3$ ” to represent two groups of three, for example, in solving the following problem:

Each box has 3 pieces of cake, how many pieces of cake are there in 2 boxes?

The expression can be written as “ $3 \times 2$ ” or “ $2 \times 3$ ”.

In this learning unit, students are required to recognise that the term “product” denotes the result of multiplication.

Examples of vocabularies to be learnt: multiplication sign, product, multiplication table, etc.

| Learning Unit                 | Learning Objective                                                                                                                                                                | Time |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>          |                                                                                                                                                                                   |      |
| <b>2N4</b><br>4-digit numbers | 1. recognise 4-digit numbers<br>2. recognise the concept of the thousands place<br>3. perform counting in groups of 200, 250, 500 and 1000<br>4. compare the magnitude of numbers | 2.5  |

### Explanatory Notes:

Similar to the learning of 3-digit numbers, students are required to recognise the numerals representing 4-digit numbers by counting, reading and writing. Students should recognise that ten hundreds are a thousand and the value represented by the numeral in the thousands place.

Students are required to count onwards from a designated 3-digit number to a designated 4-digit number, or to count backwards from a designated 4-digit number to a designated 3-digit number, e.g. counting onwards from 990 one by one to 1000, counting backwards by hundreds from 1240 to 540. Students should recognise how to determine whether a 4-digit number is an odd or even number by checking the numeral in its units place. When comparing the magnitude of two numbers, teachers should let students verbally report the comparison result, and then let them use the symbols to record them.

In this learning unit, students are required to perform counting in groups of 200, 250, 500 and 1000, in which calculation is not involved. Students can use this counting method to count a group of notes and coins with a higher total value and to read the measurement on a beaker and a scale. This learning unit should be taught prior to the Learning Unit 2M3 “Money (II)”.

Examples of vocabularies to be learnt: 4-digit number, thousands place, etc.

| Learning Unit                                | Learning Objective                                                                                                                     | Time |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>                         |                                                                                                                                        |      |
| <b>2N5</b><br>Addition and subtraction (III) | 1. perform subtraction of two numbers<br>2. perform mixed operations of addition and subtraction of three numbers<br>3. solve problems | 8.5  |

### Explanatory Notes:

In this learning unit, subtraction will be extended to two numbers which are up to three digits, and borrowing is included. In mixed operations of addition and subtraction of three numbers (includes addition of three numbers and subtraction of three numbers), addition and subtraction of numbers more than three digits are not required, which means operations like  $567+489-123 = 1056-123$  are excluded. Students should recognise that the conventional order from left to right when performing addition or subtraction should also be applied in mixed operations of addition and subtraction of three numbers, such as  $7-2+3 = 5+3 = 8$ .

This learning unit should be arranged after Learning Unit 2M3 “Money (II)”. Problems related to money are required. When dealing with calculations involving dollars and cents, the calculations should not involve decimals. This is because Primary Two students have not yet recognised the concept of decimals.

e.g. Amy pays 10 dollars for a ruler that costs 3 dollars 80 cents. How much change should the shopkeeper give?

Horizontal form: 10 dollars–3 dollars 80 cents = 6 dollars 20 cents

column form

|   |    |     |
|---|----|-----|
|   | \$ | 10¢ |
| 1 | 0  | 0   |
| – | 3  | 8   |
| 6 | 2  | 2   |

Primary Two students should solve basic word problems of mixed operations of addition and subtraction. Problems involving both “more (less) than” and “altogether” are tackled in Learning Unit 3N4, for example: “Andy has 10 pieces of candy and he has 2 pieces more

than that of Betty. How many pieces of candy do they have altogether?”

After students have mastered the skills of performing mixed operations of addition and subtraction, teachers should teach them how to estimate the results of calculations so as to let them understand the advantages of estimation and enhance the effectiveness of learning.

| Learning Unit                | Learning Objective                                                                                                                                            | Time |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>         |                                                                                                                                                               |      |
| <b>2N6</b><br>Basic division | 1. recognise the basic concept of division<br>2. perform basic division<br>3. recognise the relation between multiplication and division<br>4. solve problems | 11.5 |

### Explanatory Notes:

The concepts of division include sharing and grouping. Teachers may introduce the concepts of division by games of distributing things. The examples used should be limited to those that can be solved by “the multiplication table (0-10)”.

In activities of distributing things by division, no matter whether sharing or grouping is involved, situations with remainder and without remainder should be included. In the process of recognising the concept of division, students are required to present verbally the result of division, and then use diagrams, text and symbols to record the result, in order to master the relation between the concept of division and its expression.

Record “ $8 \div 2 = 4$ ” in diagram:



Record in text: eight is divided into two equal portions, each portion is four.

Record in symbol :

|                                                                                                                            |                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| $8 \div 2 = 4$ $\begin{array}{r} 4 \\ 2 \overline{) 8} \\ \underline{8} \end{array}$<br>(read as: 8 divided by 2 equals 4) | $7 \div 3 = 2 \dots 1$ $\begin{array}{r} 2 \\ 3 \overline{) 7} \\ \underline{6} \\ 1 \end{array}$<br>(read as: 7 divided by 3 equals 2 with remainder 1) |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|

Students are required to recognise that the term “quotient” denotes the result of division and the concepts of dividend, divisor and remainder. Teachers should discuss with students the reason why the remainder is always smaller than the divisor and use the daily life examples to illustrate how remainders are handled in the problems. Students should recognise that

when 0 is divided by any non-zero number, the result is 0.

Teachers should use concrete examples of division and multiplication to enable students to find out the relation between multiplication and division, so that they can verify the result of division by multiplication.

Teachers may provide students with examples with contexts to enable them to discover that commutative property does not hold for division, e.g.  $2 \div 8$  does not equal  $8 \div 2$ . Although teachers may use the term “commutative property” in their explanation, the curriculum does not require students to use this term.

Examples of vocabularies to be learnt: equal portion, divided by, dividend, divisor, quotient, remainder, division sign, etc.

| Learning Unit                              | Learning Objective                                                                                                                                                                                                                                                                                                   | Time |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b>                     |                                                                                                                                                                                                                                                                                                                      |      |
| <b>2M1</b><br>Length and distance<br>(III) | 1. recognise metre (m)<br>2. measure and compare the lengths of objects, and measure and compare the distances between objects in metre<br>3. record the lengths of objects and the distances between objects in appropriate measuring units<br>4. estimate the result of measurements with <b>ever-ready rulers</b> | 5    |

### Explanatory Notes:

Students have learnt how to measure and compare the lengths of objects, and measure and compare the distances between objects in centimetre. Teachers should guide students to understand the need for using a larger unit of length.

After introducing the standard unit metre (m), teacher should help students to recognise metre through various activities. Students are required to recognise that 100 cm equal to 1 m.

Students are required to measure and compare the lengths of objects, and measure and compare the distances between objects in metre by choosing and using appropriate measuring tools, such as metre rulers, tape measures and trundle wheels. Teachers should teach students the skills in using measuring tools and discuss with them on how to record the lengths of objects and the distances between objects in appropriate measuring units through real life examples.

At Key Stage 1, students may use ways such as 110 cm and 1 m 10 cm for recording lengths and distances, and convert 1 m 10 cm to 110 cm. However, problems on converting a single unit to a compound unit are not required. Recording lengths and distances using decimals are dealt with in Learning Unit 4N7 Decimals (I).

Students are required to estimate the result of measurements with ever-ready rulers, such as arm span, length of arm and pace length, and understand the points to note when using the ever-ready rulers. After students have acquired the experience of measurements, teachers should teach them how to estimate the result of measurements and encourage them to estimate the result before measuring.

Examples of vocabularies to be learnt: metre (m), metre ruler, tape measure, trundle wheel, etc.

| Learning Unit           | Learning Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Time |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |
| <b>2M2</b><br>Time (II) | <ol style="list-style-type: none"> <li>1. tell time to the nearest minute</li> <li>2. recognise minute (min)</li> <li>3. measure and compare the time intervals in minutes</li> <li>4. solve simple problems related to time intervals</li> <li>5. recognise that there are 24 hours in a day</li> <li>6. recognise the concepts of morning (a.m.) and afternoon (p.m.)</li> <li>7. tell time using “morning”, “afternoon”, “noon” and “midnight”</li> <li>8. recognise the number of days in each month</li> <li>9. recognise the numbers of days in a common year and a leap year</li> <li>10. solve problems related to the numbers of days spent on events</li> </ol> | 5.5  |

### **Explanatory Notes:**

Students have learnt how to tell time from analogue clocks using “...o’clock” and “half past...”. Teachers should make use of students’ prerequisite knowledge to help them tell time to the nearest minute. Students are required to tell time from analogue clocks and digital clocks. Drawing hour hands and minute hands to indicate time is not required. Teachers should also help students consolidate the concepts of ordering of time, later and earlier.

After introducing the concepts of 1 minute, 2 minutes ... and 60 minutes, teachers should help students establish the sense of one minute through activities. Students should recognise that there are 60 minutes in 1 hour.

Students are required to measure and compare the time intervals in minutes by using clocks or stopwatches. Each time interval in the measurement must be a whole number and is not more than 60 minutes.

Students are only required to solve simple problems on finding the finishing time from the starting time and time interval, and finding the time interval from the starting time and

finishing time. All time intervals involved must be whole numbers and not more than 60 minutes. For example, Peter agrees to meet with friends at 3:50 in a restaurant but he is 20 minutes late. When does he arrive the restaurant?

Students are required to recognise that there are 24 hours in a day, and the concepts of morning (a.m.) and afternoon (p.m.). They are also required to tell time using “morning”, “afternoon”, “noon” and “midnight” from analogue clocks and digital clocks by observing the context of the situations. Teachers may let students recognise that the time of noon and midnight can be written as “12:00 noon” and “12:00 midnight” respectively. Students are required to know time is continuous and they should also know that 12:00 midnight is the end of a day as well as the start of the next day.

Students are required to recognise the number of days in each month. By observing the calendars for several consecutive years, students should discover that the number of days in February may not be the same every year. The number of days in a common year and a leap year could be introduced at that time. Given any two of the starting date, finishing date and number of days spent on an event, students are required to find the unknown quantity/date by reading the calendar.

Examples of vocabularies to be learnt: minute, morning, afternoon, noon, midnight, common year and leap year, etc.

| Learning Unit            | Learning Objective                                                                                                                                                                 | Time |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b>   |                                                                                                                                                                                    |      |
| <b>2M3</b><br>Money (II) | 1. recognise the notes in circulation in Hong Kong<br>2. recognise the notation of marked prices of greater amounts from price tags<br>3. recognise the use of money in daily life | 5    |

### Explanatory Notes:

Students have recognised the coins in circulation in Hong Kong in Primary One. Teachers should help students recognise the notes in circulation in Hong Kong through various activities, e.g. observing the colours, patterns, words and numbers printed on the notes, and comparing the size of the notes, etc. Students should recognise the patterns of notes in circulation, e.g. the notes with same denominations but issued by different note-issuing organisations.

Teachers should help students recognise the notation of marked prices of greater amounts from price tags through examples with context, e.g. reading the marked price such as “\$23.50” as “twenty-three dollars and fifty cents”. Students are required to read marked prices not more than 1000 dollars. Teachers are not required to mention the place value of decimal numbers. Students are not required to write marked prices. However, teachers should write marked prices in the form such as “\$23.00”.

Students should recognise the use of money in daily life. It includes counting a group of notes and coins with a total not more than 1000 dollars. However, students are not required to write numerical expressions to show the working. Students are only required to do following exchange:

- (1) the exchange involving only 10-dollar, 20-dollar, 50-dollar and 100-dollar notes. For example, one 10-dollar note, two 20-dollar notes and one 50-dollar note can be exchanged for one 100-dollar note;
- (2) the exchange involving only 100-dollar, 500-dollar and 1000-dollar notes. For example, one 1000-dollar note can be exchanged for two 500-dollar notes;

Students are not required to do exchange between the notes across group (1) and group (2). For example, exchanging one 500-dollar note for ten 50-dollar notes is not required.

Problems on giving change are tackled in Learning Unit 2N5 “Addition and subtraction

(III)". Problems of decimal operations involving money are tackled in Learning Units 4N8 "Decimals (II)", 5N4 "Decimals (III)" and 6N1 "Decimals (IV)".

Examples of vocabularies to be learnt: note and money, etc.

| Learning Unit                 | Learning Objective                                                                                          | Time |
|-------------------------------|-------------------------------------------------------------------------------------------------------------|------|
| <b>Shape and Space Strand</b> |                                                                                                             |      |
| <b>2S1</b><br>3-D shapes (II) | 1. recognise the concept of faces of a 3-D shape<br>2. recognise the names of different prisms and pyramids | 3    |

### Explanatory Notes:

In this learning unit, the concepts of 3-D shapes that students have to recognise will be extended from the intuitive concepts of 3-D shapes in Primary One to faces of 3-D shapes, which is the basic structure of 3-D shapes.

Teachers may arrange hands-on activities, such as rubbing the outline of 3-D shapes on a piece of paper, to enable students to recognise the concept of faces of 3-D shapes, which include the concepts of the bases and lateral faces\* of a prism and a pyramid, the bases and curved surface of a cylinder and a cone and the curved surface of a sphere. However, teachers should avoid using oblique 3-D shapes as examples. Students are required to name different prisms and pyramids, such as “quadrilateral prism” and “pentagonal pyramid”, by the shapes of their bases. In this learning unit, students are not required to further recognise quadrilateral prisms as cubes or cuboids, as this is the learning content of Learning Unit 5S2 “3-D shapes (III)”.

Examples of vocabularies to be learnt: face, base, lateral face, curved surface, square, rectangle, triangular prism, quadrilateral prism, pentagonal prism, hexagonal prism, triangular pyramid, quadrilateral pyramid, pentagonal pyramid, hexagonal pyramid, etc.

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\* Students are required to recognise that the lateral faces of prisms are rectangles or squares. But the concepts and properties of rectangles and squares are the learning content of Learning Unit 2S4 “Quadrilaterals (I)”. In this Learning Unit, students may thus intuitively recognise that the lateral faces of prisms are rectangles or squares, or just describe the lateral faces as quadrilaterals.

| Learning Unit                 | Learning Objective                                                                                                                                                                                                                                                                                                                                                             | Time |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Shape and Space Strand</b> |                                                                                                                                                                                                                                                                                                                                                                                |      |
| <b>2S2</b><br>Angles          | <ol style="list-style-type: none"> <li>1. recognise the concept of angles</li> <li>2. compare the sizes of angles</li> <li>3. recognise the concepts of right angles and perpendicular lines</li> <li>4. draw and make perpendicular lines</li> <li>5. recognise the concepts of acute angles and obtuse angles</li> <li>6. draw and make angles of different sizes</li> </ol> | 7    |

### **Explanatory Notes:**

Teachers may introduce the concept of angles to students by making use of the daily life examples, such as turning the hands of a clock face or two sticks.

Students are required to recognise that the size of an angle is the extent of the opening of the two sides of the angle. Students are required to compare the sizes of angles and recognise that the size of an angle is independent of the length of the sides drawn.

Teachers may use the objects in daily life to let students recognise the concept of right angles, e.g. the right angles on book corners, on a piece of paper, on a ruler, etc. Students should know how to use tools such as set squares to identify right angles. They should know that acute angles are smaller than a right angle and obtuse angles are larger than one right angle, but smaller than two right angles. The learning content involving the unit “degrees”, e.g. right angles equal to  $90^\circ$ , and the concepts of straight angles, round angles and reflex angles are dealt with in Learning Unit 6M1 “Angles (degree)”.

Teachers may let students use different methods to draw and make angles of different sizes, e.g. drawing angles along the corner of a book and a photo frame and making angles on the pin-board and by folding paper etc.

Students recognised the intuitive concept of straight lines in Primary One. In this learning unit, students should recognise that perpendicular lines intersect at right angles, and they should know how to use tools such as set squares to identify perpendicular lines.

Teachers may let students use different tools such as rulers and set squares to draw

perpendicular lines. Drawing them under the following conditions is required:

- through a given point on the straight line, draw a straight line perpendicular to the given straight line
- through a given point not on the straight line, draw a straight line perpendicular to the given straight line

Students are required to recognise that when given a straight line and a point not lying on the straight line, amongst the lines joining the given point and the points on the given straight line, the line perpendicular to the given line has the shortest length. The length is used to denote the distance from the point to the straight line.

Examples of vocabularies to be learnt: angle, right angle, acute angle, obtuse angle, perpendicular to each other, perpendicular lines, ruler, set square, etc.

| Learning Unit                               | Learning Objective                                                                                           | Time |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------|------|
| <b>Shape and Space Strand</b>               |                                                                                                              |      |
| <b>2S3</b><br>Directions and positions (II) | 1. recognise the four main directions: east, south, west and north<br>2. use a compass to measure directions | 2.5  |

### **Explanatory Notes:**

In this learning unit, students are required to recognise the four main directions: east, south, west and north, and their respective short forms “E”, “S”, “W” and “N”. Students are also required to use the sentence “\_\_\_\_ is to the east/south/west/north of \_\_\_\_ ” to describe relative positions of objects.

Students are required to use the compass to measure the four main directions and walk along the direction indicated by the compass. As a further application to the relative positions left and right of objects learnt in Primary One, request of turning left or right may be involved.

Examples of vocabularies to be learnt: direction, east, south, west, north, compass, etc.

| Learning Unit                    | Learning Objective                                                                                                                                                                                             | Time |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Shape and Space Strand</b>    |                                                                                                                                                                                                                |      |
| <b>2S4</b><br>Quadrilaterals (I) | 1. recognise the concept of line segments<br>2. recognise the concept of quadrilaterals<br>3. recognise the concepts and basic properties of squares and rectangles<br>4. draw and make squares and rectangles | 9    |

### Explanatory Notes:

Students are required to recognise that amongst the lines (shown in the diagram below), joining two given end points, the straight one is called “line segment”. It has the shortest length amongst the lines joining the two given end points. Students are not required to use the term “end point”.



In Learning Unit 1S2 “2-D shapes”, students had a preliminary understanding that a quadrilateral is formed with four straight lines connected end to end on a plane. In this learning unit, students should recognise that these straight lines are line segments. They are the four sides of the quadrilateral. Students are also required to recognise the concepts of opposite sides and adjacent sides of a quadrilateral, which are basic knowledge for their further study of the properties of different quadrilaterals. In this learning unit, students should recognise the basic properties of squares and rectangles.

The basic properties of squares include:

- the four angles are right angles
- the four sides are equal in length

The basic properties of rectangles include:

- the four angles are right angles
- the opposite sides are equal in length

Students should know how to identify squares and rectangles according to the above

properties. In this learning unit, teachers should avoid using squares as examples to describe the properties of rectangles. The inclusion relation between squares and rectangles is dealt with in Primary Four.

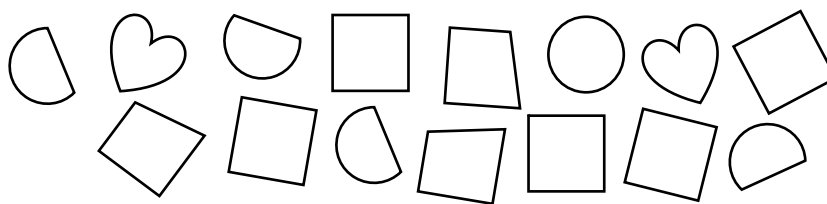
Teachers may provide students with different kinds of papers such as dot grid papers, grid papers and blank papers, etc. to draw squares and rectangles of different sizes. Teachers may also provide students with different materials such as cotton strings, straws and geometric strips, etc. to make squares and rectangles of different sizes.

Examples of vocabularies to be learnt: line segment, opposite side, adjacent side, etc.

| Learning Unit               | Learning Objective                                                            | Time |
|-----------------------------|-------------------------------------------------------------------------------|------|
| <b>Data Handling Strand</b> |                                                                               |      |
| <b>2D1</b><br>Pictograms    | 1. recognise pictograms<br>2. interpret pictograms<br>3. construct pictograms | 3.5  |

### Explanatory Notes:

This learning unit is the first topic in Data Handling for students. Before introducing pictograms, teachers should let students recognise the importance of the organisation and representation of data through concrete examples so as to lay the foundation for learning other topics in Data Handling. For example, teachers may show certain number of different 2-D shapes on the blackboard randomly as below.



Then, teachers may ask students to find or compare the number of designated 2-D shapes on the blackboard and let them express the difficulties on telling the results. Teachers should guide students to understand the importance of the organisation and representation of data and introduce some advantages of using pictograms to present data afterwards.

In this learning unit, students are only required to interpret and construct the pictograms using the one-to-one representation. Pictograms in horizontal and vertical forms are required. Teachers should select some contexts that students are familiar with when asking students to interpret and construct pictograms. There should not be too much data and items involved in a pictogram.

Examples of vocabularies to be learnt: pictogram, title, each...stands for..., item, etc.

| Learning Unit                           | Learning Objective                                                                                                                                                         | Time |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Further Learning Unit</b>            |                                                                                                                                                                            |      |
| <b>2F1</b><br>Inquiry and investigation | Through various learning activities, discover and construct knowledge, further improve the ability to inquire, communicate, reason and conceptualise mathematical concepts | 10   |

**Explanatory Notes:**

This Learning Unit aims at providing students with more opportunities to engage in the activities that avail themselves of discovering and constructing knowledge, further improving their abilities to inquire, communicate, reason and conceptualise mathematical concepts when studying other Learning Units. In other words, this is not an independent and isolated learning unit and the activities may be conducted in different stages of a lesson, such as motivation, development, consolidation or assessment.

| Learning Unit                 | Learning Objective                                                                                                         | Time |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>          |                                                                                                                            |      |
| <b>3N1</b><br>5-digit numbers | 1. recognise 5-digit numbers<br>2. recognise the concept of the ten thousands place<br>3. compare the magnitude of numbers | 2.5  |

### **Explanatory Notes:**

In Primary Two, students recognised 3-digit numbers and 4-digit numbers, and the meaning of the numeral in the hundreds place and the thousands place. In this learning unit, students are required to recognise 5-digit numbers and the concept of the ten thousands place. Similar to the learning of 3-digit numbers and 4-digit numbers, students are required to recognise the numerals representing 5-digit numbers by counting, reading and writing. They should recognise that ten thousands are one ten thousand and the meaning of the numeral in the ten thousands place.

Students are required to count onwards from a designated 4-digit number or 5-digit number to another designated 5-digit number, or to count backwards, e.g. counting onwards from 9990 one by one to 10000, and counting backwards by thousands from 12400 to 8400, etc. Students should recognise how to determine whether a 5-digit number is an odd or even number by checking the numeral in its units place.

Students are required to compare the magnitude of numbers and use the symbols “=”, “>” and “<” to record the result.

Examples of vocabularies to be learnt: 5-digit number, ten thousands place, etc.

| Learning Unit                    | Learning Objective                                                                                                                                       | Time |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>             |                                                                                                                                                          |      |
| <b>3N2</b><br>Multiplication (I) | <ol style="list-style-type: none"> <li>perform simple multiplication</li> <li>perform multiplication of three numbers</li> <li>solve problems</li> </ol> | 6    |

### Explanatory Notes:

In this learning unit, multiplication will be extended to:

- 2-digit number  $\times$  1-digit number (1-digit number  $\times$  2-digit number)
- 3-digit number  $\times$  1-digit number (1-digit number  $\times$  3-digit number)

Multiplication with carrying is included.

Students are required to master the steps of performing multiplication in column form and understand the principle behind. For example, students have to understand why the product of  $43 \times 2$  can be obtained by calculating the sum of the products of  $40 \times 2$  and  $3 \times 2$ , and why “8” is written under “4” in the column form. Teachers should let students know no matter whether it is a 2-digit number, a 3-digit number or a multi-digit number times 1-digit number, the principle of operation remains the same.

Teachers may provide students with examples with contexts to enable them to discover the associative property of multiplication of three numbers, and design some concrete examples to let students understand that using the associative property of multiplication can speed up the calculations, so as to motivate their learning in mathematics. Although teachers may use the term “associative property” in their explanation, the curriculum does not require students to use this term.

After students have mastered the skills of performing multiplication, teachers should teach them how to estimate the results of calculations so as to let them understand the advantages of estimation and enhance the effectiveness of learning.

| Learning Unit              | Learning Objective                                                                                                                           | Time |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>       |                                                                                                                                              |      |
| <b>3N3</b><br>Division (I) | <ol style="list-style-type: none"> <li>perform simple division</li> <li>perform division of three numbers</li> <li>solve problems</li> </ol> | 7.5  |

### Explanatory Notes:

In this learning unit, division will be extended to:

- 2-digit number  $\div$  1-digit number
- 3-digit number  $\div$  1-digit number

Division with borrowing and division involving remainder are required.

Students are required to master the steps of performing division in column form and understand the principle behind. For example, students should understand why the quotient of  $68 \div 2$  can be obtained by calculating the sum of the quotients of  $60 \div 2$  and  $8 \div 2$ , and why “3” is written above “6” while “4” is written above “8”. Teachers should let students know no matter whether it is a 2-digit number, 3-digit number or multi-digit number divided by 1-digit number, the principle of operation remains the same.

Students should recognise that the conventional order of performing division of three numbers goes from left to right, e.g.  $24 \div 6 \div 2 = 4 \div 2 = 2$ . In Primary Two, students recognised that commutative property does not hold for division. In this learning unit, teachers may provide students with concrete examples to enable them to discover that the associative property does not hold for division neither, e.g.  $24 \div 6 \div 2$  does not equal  $24 \div 3$ . Although teachers may use the term “associative property” in their explanation, the curriculum does not require students to use this term.

After students have mastered the skills of performing division, teachers should teach them how to estimate the results of calculations so as to let them understand the advantages of estimation and enhance the effectiveness of learning.

| Learning Unit                                | Learning Objective                                                                                                                                                                                                                                                | Time |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>                         |                                                                                                                                                                                                                                                                   |      |
| <b>3N4</b><br>Four arithmetic operations (I) | 1. recognise and use brackets<br>2. perform mixed operations of addition and subtraction of three numbers<br>3. perform mixed operations of addition and multiplication of, and subtraction and multiplication of not more than four numbers<br>4. solve problems | 13.5 |

### Explanatory Notes:

Students should recognise the purpose of using brackets and use brackets to indicate the order of calculations in an expression.

In this learning unit, the numbers involved in the mixed operations of addition and subtraction of three numbers (including the addition of three numbers and subtraction of three numbers) will be extended to numbers with not more than four digits. Students should perform the mixed operations of addition and multiplication, subtraction and multiplication of not more than four numbers with the conventional order multiplication before addition and subtraction.

Students are required to recognise that when mixed operations involve brackets, the operation inside the brackets should be performed first. At the primary level, mixed operations may involve more than one pair of brackets, such as  $(2+3) \times (5+3)$ , but operations involving multiple levels of brackets, such as  $(4 - (2-1)) \times 3$ , are not required. Such operations belong to the learning content at junior secondary level.

Teachers may provide examples with contexts to let students recognise the following relations:

$$a \times (b + c) = a \times b + a \times c$$

$$(a + b) \times c = a \times c + b \times c$$

$$a \times (b - c) = a \times b - a \times c$$

$$(a - b) \times c = a \times c - b \times c$$

where  $a$ ,  $b$  and  $c$  are whole numbers.

In this learning unit, students are only required to recognise the relations in the above equalities, and they are not required to perform conversion between the two sides of the equality. The distributive property of multiplication and the application of the above relations are dealt with in Learning Unit 4N5 “Four arithmetic operations (II)”.

Students are only required to solve the basic word problems of mixed operations of addition and subtraction in Primary Two. Problems involving both “more (less) than” and “altogether” are tackled in this learning unit, for example: “Andy has 10 pieces of candy and he has 2 pieces more (less) than that of Betty. How many pieces of candy do they have altogether?”

After students have mastered the skills of performing mixed operations of addition and subtraction, addition and multiplication, subtraction and multiplication, teachers should teach them how to estimate the results of calculations so as to let them understand the advantages of estimation and enhance the effectiveness of learning.

Examples of vocabularies to be learnt: bracket, etc.

| Learning Unit               | Learning Objective                                                                                                                                                                                                                                                                                                                        | Time |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Number Strand</b>        |                                                                                                                                                                                                                                                                                                                                           |      |
| <b>3N5</b><br>Fractions (I) | <ol style="list-style-type: none"> <li>1. recognise the concept of fractions</li> <li>2. recognise the concept of equivalent fractions</li> <li>3. compare the magnitude of fractions with the same denominator or numerator</li> <li>4. perform addition and subtraction of at most three fractions with the same denominator</li> </ol> | 9.5  |

### Explanatory Notes :

In this learning unit, students are required to recognise the concepts of fractions, including:

- fractions as a part of a whole object (one whole)
- fractions as a part of a set of objects (one whole)

where the fractions involved are not greater than 1.

Students are required to read and write the fractions representing a part of one whole, including the terms “numerator”, “denominator” and “fraction line”.

Teachers should provide students with examples with contexts or hands-on activities to enable them to recognise how to use fractions to express a part of one whole and a part of a set of objects, e.g. the coloured part of a piece of paper, the portions of candies being taken away from the whole pack, etc. Teachers should emphasise the importance of dividing the whole into a number of equal parts.

Students may recognise the concept of equivalent fractions through the use of concrete objects or diagram representations, e.g.  $\frac{1}{2} = \frac{2}{4} = \frac{9}{18}$  of a whole, but students are not required to recognise or use expansion and reduction to calculate the equivalent fractions, which are dealt with in Learning Unit 4N6 “Fractions (II)”. Students should recognise that if a fraction has the same denominator and numerator, its value is 1, for example

$$\frac{1}{1} = \frac{2}{2} = \frac{5}{5} = \frac{12}{12} = 1.$$

Students should also recognise that fractions such as  $\frac{0}{2}$  ,  $\frac{0}{5}$  ,  $\frac{0}{12}$  , etc. are 0.

In this learning unit, students are only required to deal with the comparison between fractions not greater than 1 and either with same denominator or same numerator.

Students are required to solve problems presented in diagrams, in which only addition or subtraction of not more than three fractions with the same denominator is involved. Teachers should let students verbally solve the problems before recording their work in horizontal form (e.g.  $\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$  ). The calculations using common factors (e.g.  $\frac{2+1}{5}$  ) are not required. As students do not have the concept of improper fractions and mixed fractions, the fractions in horizontal forms or in the result must not be greater than 1. Also, as students have not grasped the concept of the reduced fraction in this learning unit, they should not be required to give the fraction in its simplest form in the answer.

Examples of vocabularies to be learnt: the whole, parts, fraction, equivalent fractions, numerator, denominator, fraction line, etc.

| Learning Unit                             | Learning Objective                                                                                                                                                                                                                                                                                                                                                                   | Time |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b>                    |                                                                                                                                                                                                                                                                                                                                                                                      |      |
| <b>3M1</b><br>Length and distance<br>(IV) | 1. recognise kilometre (km)<br>2. compare the lengths of objects and compare the distances between objects in kilometre<br>3. recognise millimetre (mm)<br>4. measure and compare the lengths of objects, and measure and compare the distances between objects in millimetre<br>5. record the lengths of objects and the distances between objects with appropriate measuring units | 6    |

### Explanatory Notes:

Students have learnt how to measure and compare the lengths of objects, and measure and compare the distances between objects in metre. Teachers should use examples to guide students to understand the need for using a larger unit of length.

After introducing the standard unit kilometre (km), teachers should help students recognise kilometre through various activities. Students are required to recognise 1000 m equal to 1 km. Teachers should use examples to enable students to recognise the use of kilometre in daily life, and help them to compare the lengths of objects and compare the distances between objects in kilometre. After introducing the standard unit millimetre (mm), teachers should help students recognise millimetre through various activities. Students are required to recognise 10 mm equal to 1 cm.

Students are required to measure and compare the lengths of objects, and measure and compare the distances between objects in millimetre by choosing and using appropriate measuring tools, such as rulers and tape measures. Teachers should teach students the skills in using measuring tools. After students have acquired the experience of measurements, teachers should teach them how to estimate the result of measurements and encourage them to estimate the result before measuring.

Teachers should use real-life examples to enable students recognise how to record the lengths of objects and the distances between objects with appropriate measuring units that they have learnt.

At Key Stage 1, students may use ways such as 13 mm and 1 cm 3 mm for recording lengths and distances, and convert 1 cm 3 mm to 13 mm. However, problems on converting a single unit to a compound unit are not required. Recording lengths and distances using decimals are dealt with in Learning Unit 4N7 Decimals (I).

Examples of vocabularies to be learnt: kilometre (km), millimetre (mm), etc.

| Learning Unit            | Learning Objective                                                                                                                                                                                  | Time |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b>   |                                                                                                                                                                                                     |      |
| <b>3M2</b><br>Time (III) | <ol style="list-style-type: none"> <li>1. recognise second (s)</li> <li>2. measure and compare the time intervals in seconds</li> <li>3. solve simple problems related to time intervals</li> </ol> | 4    |

### **Explanatory Notes:**

Students have learnt about hour and minute in Primary One and Primary Two. Teachers should make use of students' prerequisite knowledge to help them recognise second (s). After introducing the concepts of 1 second, 2 seconds, 3 seconds ... and 60 seconds, teachers should help students establish the sense of 1 second through activities. Students should recognise that there are 60 seconds in 1 minute.

Students are required to measure and compare the time intervals in seconds by using tools such as metronomes, stopwatches or clocks. In Learning Objective 2, although there is no limitation on the time intervals for taking measurements, the time intervals involved should be reasonable. Teachers should encourage students to estimate the time intervals.

In Primary One and Primary Two, students are only required to solve simple problems on finding the finishing time or time interval from the information provided. For Learning Objective 3, it aims at continuing students' learning in Primary One and Primary Two. Given any two of the starting time, finishing time and time interval, students are required to find the unknown quantity/time. When designing problems related to time intervals, teachers should consider students' prerequisite knowledge. Each time interval must be a whole number and only involves hours or minutes. The time intervals involve hours should not be more than 12 hours while those involve minutes should not be more than 60 minutes.

Examples of vocabularies to be learnt: second, stopwatch, etc.

| Learning Unit          | Learning Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Time |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |
| <b>3M3</b><br>Capacity | <ol style="list-style-type: none"> <li>1. recognise the concept of capacity</li> <li>2. compare intuitively the capacities of containers</li> <li>3. compare directly the capacities of containers</li> <li>4. compare the capacities of containers in improvised units</li> <li>5. recognise litre (L) and millilitre (mL)</li> <li>6. measure and compare the capacities of containers in litre and millilitre</li> <li>7. record the capacity of containers with appropriate measuring units</li> </ol> | 7    |

### Explanatory Notes:

In this learning unit, students are required to recognise the concepts of capacity by intuitive comparison, direct comparison, comparison in improvised units and standard units. Students are required to understand that they can obtain the comparison results by observation or by tools.

Teachers should introduce the concepts of capacity and container in some contexts that students are familiar with. In Learning Objective 2, students are required to compare the capacities of containers intuitively. Teachers should select containers with significant differences in capacities to help students achieve the learning objective. In Learning Objective 3, teachers should discuss with students the points to note when comparing the capacities of containers directly.

Students are required to compare the capacities of containers in improvised units. Teachers should discuss with students the points to note when using improvised units. Students are also required to choose appropriate improvised units for taking measurements in particular situations. Teachers should not ask students to sort many containers by capacity at the same time. Teachers should help students understand the need for using standard unit through activities.

When introducing the standard units litre (L) and millilitre (mL), teachers should enable students to recognise that the symbols of litre and millilitre can be written in small letters.

Since the small letter of “L” is easily confused with the Arabic numerals “1”, the capital letter “L” is generally used for the symbol of litre. After introducing the standard units litre and millilitre, teachers should help students recognise litre and millilitre through various activities. Students are required to recognise 1000 ml equal to 1 L.

Students are required to measure and compare the capacities of containers in litre and millilitre by choosing and using appropriate measuring tools. Teachers should teach students the skills in using measuring tools, e.g. the sightlines should be near to the water level when reading the marks of a measuring cup. After students have acquired the experience of measurements, teachers should teach them how to estimate the result of measurements and encourage them to estimate the result before measuring.

Teachers should use real-life examples, such as household detergents and drinks to help students recognise how to record the capacity of containers with appropriate measuring units.

At Key Stage 1, students may use ways such as 1030 mL and 1 L 30 mL for recording capacities, and convert 1 L 30 mL to 1030 mL. However, problems on converting a single unit to a compound unit are not required. Recording capacities using decimals are dealt with in Learning Unit 4N7 Decimals (I).

Examples of vocabularies to be learnt: capacity, container, measuring cup, millilitre (mL), litre (L), etc.

| Learning Unit           | Learning Objective                                                        | Time |
|-------------------------|---------------------------------------------------------------------------|------|
| <b>Measures Strand</b>  |                                                                           |      |
| <b>3M4</b><br>Time (IV) | 1. recognise the 24-hour time<br>2. tell time in term of the 24-hour time | 3    |

### **Explanatory Notes:**

Students have learnt telling time in terms of the 12-hour time in Primary One and Primary Two. Teachers should make use of students' prerequisite knowledge to help them understand that telling time in terms of the 12-hour time may easily cause confusion. Therefore, the 24-hour time is introduced.

Students are required to recognise the ways of showing the 24-hour time, e.g. the two digits on the left represent "hour" and the two digits on the right represent "minute"; the starting time of a day is shown as 00:00, and the ending time of a day is shown as 24:00. Students are also required to tell time in terms of the 24-hour time, and recognise the relationship between the 12-hour time and the 24-hour time.

In this learning unit, students are not required to solve problems related to time intervals in the 24-hour time. Those problems should be dealt with in Learning Unit 6M4 Speed.

Examples of vocabularies to be learnt: 12-hour time, 24-hour time, etc.

| Learning Unit          | Learning Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Time |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Measures Strand</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| <b>3M5</b><br>Weight   | <ol style="list-style-type: none"> <li>1. recognise the concept of weight</li> <li>2. compare intuitively the weights of objects</li> <li>3. compare directly the weights of objects</li> <li>4. compare the weights of objects in improvised units</li> <li>5. recognise gram (g) and kilogram (kg)</li> <li>6. measure and compare the weights of objects in gram and kilogram</li> <li>7. record the weight of objects in appropriate measuring units</li> </ol> | 5.5  |

### **Explanatory Notes:**

In this learning unit, students are required to recognise the concepts of weight by intuitive comparison, direct comparison, comparison in improvised units and standard units. Students are required to understand that they can obtain the comparison results by sensation or by tools.

Teachers should introduce the concepts of weight in some contexts that students are familiar with. For example, more strength are needed for lifting a heavier object by hands. In Learning Objective 2, students are required to compare the weights of objects intuitively. Teachers should select objects with significant differences in weights to enable students to lift the objects by left hand and right hand respectively for doing comparison. In Learning Objective 3, students are required to compare directly the weights of objects by beam balances. Teachers should guide students recognise the points to note when comparing the weights of objects with beam balances. For example, the objects should better place at the centre of the plate of a beam balance.

Students are required to compare the weights of objects in improvised units. Teachers should discuss with students the points to note when using improvised units. For example, improvised units of same weight must be used. Students are also required to choose appropriate improvised units for taking measurements in particular situations. Teachers should not ask students to sort many objects by weight at the same time. Teachers should help students understand the need for using standard units through activities.

After introducing the standard units gram (g) and kilogram (kg), teachers should help students to recognise gram and kilogram through various activities. Students are required to recognise 1000 g equal to 1 kg. Gram and kilogram are units of mass. However, in view of the language habits of the majority in their daily life, it is suggested not to mention the term “mass”.

Students are required to measure and compare the weights of objects in gram and kilogram by choosing and using appropriate measuring tools. Teachers should teach students how to read the weights from weighing scales. After students have acquired the experience of measurements, teachers should teach students how to estimate the result of measurements and encourage them to estimate the result before measuring. Teachers should use real-life examples to help students recognise how to record the weight of objects in appropriate measuring units.

At Key Stage 1, students may use ways such as 1030 g and 1 kg 30 g for recording weights, and convert 1 kg 30 g to 1030 g. However, problems on converting a single unit to a compound unit are not required. Recording weights using decimals are dealt with in Learning Unit 4N7 Decimals (I).

Examples of vocabularies to be learnt: weight, light, heavy, gram (g), kilogram (kg), beam balance, weighing scales, etc.

| Learning Unit                     | Learning Objective                                                                                                                                                                                                                                                                                                                                                                            | Time |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Shape and Space Strand</b>     |                                                                                                                                                                                                                                                                                                                                                                                               |      |
| <b>3S1</b><br>Quadrilaterals (II) | <ol style="list-style-type: none"> <li>1. recognise the concept of parallel lines</li> <li>2. draw and make parallel lines</li> <li>3. recognise the concept and properties of parallelograms</li> <li>4. recognise squares and rectangles are parallelograms</li> <li>5. recognise the concept and property of trapeziums</li> <li>6. draw and make parallelograms and trapeziums</li> </ol> | 7.5  |

### **Explanatory Notes:**

Students are required to recognise that parallel lines do not intersect, and the lines that do not intersect must be parallel. Besides, students are also required to recognise that two parallel lines are equidistant everywhere, and should know how to use different tools e.g. rulers and set squares to draw parallel lines.

Students should recognise that a quadrilateral which has two pairs of opposite sides parallel is a parallelogram and sides of each pair are equal in length. In Primary Two, students recognised that squares and rectangles have the properties that opposite sides are equal in length and have four right angles. In this learning unit, students are required to recognise that squares and rectangles are parallelograms as these two kinds of shapes have two pairs of opposite sides parallel. Therefore, when teachers request students to select all the parallelograms from a group of 2-D shapes, if there are squares and rectangles, they should also be selected.

After students have recognised squares and rectangles are parallelograms, teachers should pay attention to the design of assessments involving parallelograms. The assessment should align with the learning objectives stated in the curriculum and state clearly the requirements. For example, providing a square for students to name without stating the requirement on naming should be avoided. Teachers may consider asking students to form pairs from given shapes and names, or let students cross out incorrect names for a given shape from several given options.

Students are required to recognise that a quadrilateral which has only one pair of opposite sides parallel is a trapezium and these parallel opposite sides are the upper and lower bases of

the trapezium.

Students are required not only to identify parallelograms and trapeziums but also draw and make them. Teachers may provide students with different kinds of papers such as dot grid papers, grid papers and blank papers, etc. to draw parallelograms and trapeziums of different sizes. Teachers may also provide students with different materials such as cotton strings, straws and geometric strips, etc. to make parallelograms and trapeziums of different sizes. As students have learnt to draw and make squares and rectangles in Learning Unit 2S4 “Quadrilaterals (I)” (which are parallelograms having right angles), during classroom teaching, teachers should let students experience the drawing and making of parallelograms having no right angles. Besides, in the design of an assessment of drawing and making parallelograms, it should also be clearly indicated whether any parallelograms (i.e. including squares and rectangles) are acceptable or only parallelograms having no right angles are acceptable.

Examples of vocabularies to be learnt: parallel lines, parallelogram, trapezium, upper base, lower base, etc.

| Learning Unit                 | Learning Objective                                                                                                                                                                                                                                                                                                                                                                                                          | Time |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Shape and Space Strand</b> |                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| <b>3S2</b><br>Triangles       | <ol style="list-style-type: none"> <li>1. recognise the concepts of right-angled triangles, isosceles triangles, equilateral triangles, isosceles right-angled triangles and scalene triangles</li> <li>2. recognise the relations between different types of triangles</li> <li>3. recognise that the sum of any two sides of a triangle is greater than the remaining side</li> <li>4. draw and make triangles</li> </ol> | 9    |

### Explanatory Notes:

In this learning unit, students should recognise the concepts of right-angled triangles, isosceles triangles, equilateral triangles, isosceles right-angled triangles (can be named as “right-angled isosceles triangles”) and scalene triangles.

Students are also required to recognise some inclusion relations between different types of triangles:

- all isosceles right-angled triangles are right-angled triangles
- all isosceles right-angled triangles are isosceles triangles
- all equilateral triangles are isosceles triangles

Teachers may use diagrams such as Venn diagrams or tree diagrams to help students recognise the inclusion relations between different types of triangles, but students are not required to construct Venn diagrams and tree diagrams or read complicated Venn diagrams or tree diagrams. They are also not required to use the term “inclusion relation”. When teachers request students to select all the isosceles triangles from a group of 2-D shapes, if there are equilateral triangles, they should also be selected.

After students have recognised the inclusion relations between different types of triangles, teachers should pay attention to the design of assessment involving triangles. The assessment should align with the learning objectives stated in the curriculum and state clearly the requirement. For example, asking students to name a triangle without providing the requirement on naming should be avoided. Teachers may consider asking students to form pairs from given shapes and names, or let students cross out incorrect names for the given

shape from several given options.

Students are required to recognise that the sum of any two sides of a triangle is greater than the remaining side. Teachers may arrange hands-on exploratory activities for students to enable them to discover this property. Teachers may also provide students with different kinds of papers such as dot grid papers, grid papers and blank papers, etc. to draw triangles of different sizes. Teachers may also provide students with different materials such as cotton strings, straws and geometric strips, etc. to make triangles of different sizes by using the property mentioned in Learning Objective 3.

Examples of vocabularies to be learnt: right-angled triangle, isosceles triangle, equilateral triangle, isosceles right-angled triangle (right-angled isosceles triangle), scalene triangle, etc.

| Learning Unit                | Learning Objective                                                                                                                          | Time |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Data Handling Strand</b>  |                                                                                                                                             |      |
| <b>3D1</b><br>Bar charts (I) | <ol style="list-style-type: none"> <li>1. recognise bar charts</li> <li>2. interpret bar charts</li> <li>3. construct bar charts</li> </ol> | 4    |

### Explanatory Notes:

Students have learnt the pictograms using the one-to-one representation in Primary Two. Teachers should guide students to recognise bar charts and their advantages in presenting data after discussing the characteristics of presenting data in pictograms.

In this learning unit, students are only required to interpret and construct the bar charts using the one-to-one, one-to-two and one-to-five representations. Bar charts in horizontal and vertical forms are required.

Teachers should select some contexts that students are familiar with when asking them to construct bar charts. For example, the ways of going to school by 3A and 3B students. Teachers should guide students to recognise how to collect data, construct frequency tables using the symbols“+++”or“正”for recording data, and choose the one-to-one, one-to-two or one-to-five representations according to the magnitude of the data. Teachers should remind students the points to note when constructing bar charts. For example, the spacing between the bars should be equal and the width of the bars should be the same.

Examples of vocabularies to be learnt: frequency table, bar chart, vertical axis, horizontal axis, etc.

| Learning Unit                           | Learning Objective                                                                                                                                                         | Time |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Further Learning Unit</b>            |                                                                                                                                                                            |      |
| <b>3F1</b><br>Inquiry and investigation | Through various learning activities, discover and construct knowledge, further improve the ability to inquire, communicate, reason and conceptualise mathematical concepts | 10   |

**Explanatory Notes:**

This Learning Unit aims at providing students with more opportunities to engage in the activities that avail themselves of discovering and constructing knowledge, further improving their abilities to inquire, communicate, reason and conceptualise mathematical concepts when studying other Learning Units. In other words, this is not an independent and isolated learning unit and the activities may be conducted in different stages of a lesson, such as motivation, development, consolidation or assessment.

## **Acknowledgements**

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CDC Committee on Mathematics Education

Ad Hoc Committee on Primary Mathematics Curriculum

