Draft National Curriculum Framework for Primary Mathematics for Lower and Middle Division Students 2020-2021 Edition

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Definition and Scope of Primary Mathematics

1.1 Primary mathematics is an eight-year program for students at all levels from infant one to standard six.

1.2 Primary mathematics is designed to be scheduled for a minimum of two hundred teaching minutes per week for infant classes and three hundred teaching minutes per week from standard one to standard six.

1.3 Primary mathematics supports the achievement by students of the ninth national goal of education: understanding of number, quantity and space and the application of relevant concepts.

Aim of Primary Mathematics

2.1 Primary mathematics will enable students to apply reasoning, problem solving skills and number fluency as they engage in academic and real world activities.

Philosophical Orientation of Primary Mathematics

3.1 Knowledge of mathematics contributes to national development by supporting improved decision making in science, technology, engineering, medicine, entrepreneurship, financial literacy and other fields of human activity.

3.2 Knowledge of mathematics can help to develop desirable personal traits such as independence and discipline. As students solve problems, explore and record results, analyze observations, make and test generalizations and reach new conclusions, they develop thinking skills that are useful in everyday life and other subject areas.

3.3 All students can learn mathematics but they learn more effectively when they believe they are capable of understanding and doing mathematics and when they view it as useful and worthwhile, both inside and outside the classroom.

3.4 Instruction should promote a positive attitude, encourage students to take intellectual risks, involve frequent authentic problem solving and allow students to learn from each
other. The learning environment should create a sense of belonging and provide opportunities for success. A positive learning environment respects, values and is responsive to the diversity of student experiences, cultural heritages and ways of thinking. Caring and trusting classroom communities emphasize a strong math focus with high, yet realistic, expectations.

3.5 Students are curious, active learners with individual interests, abilities and needs. They come to classrooms with varying knowledge, life experiences and backgrounds. Effective learning builds on existing proficiencies, interests and previous experiences. A key component in successfully developing numeracy, therefore, is making connections to these backgrounds and experiences. Instruction on a new mathematical concept should usually begin with a discussion of how the concept applies to real world situations that are familiar to the students. As students perform mathematical tasks and develop mathematical ideas using their knowledge of real world situations, the purposes of mathematics will make more sense.

3.6 A variety of developmentally appropriate pedagogical approaches including problem-solving, cooperative learning, thematic discussions, inquiry, field trips and integrated projects should be used. Developmentally appropriate mathematics activities should challenge students to complete active learning tasks, both independently and collaboratively. Students should be provided with experiences that expose them to broad interpretations of key concepts and different perspectives. Teachers should encourage high levels of thinking, including making conjectures and engaging in mathematical argumentation and the testing and validation of concepts. The memorization of procedures without an accompanying understanding of why the procedure works is ineffective because it does not lead to sustainable learning.

3.7 Mathematical understanding is best developed when learners encounter experiences that proceed from the simple to the complex and from the concrete to the abstract. Concepts should be introduced, practiced and developed through the use of pictures and manipulatives.

3.8 Mathematics instruction should predominantly feature the spoken exchange of ideas. Students will learn mathematics more effectively if they are provided with the opportunity to discuss, clarify, probe and share their thinking. This can occur in both whole class and small group settings. Collaborative group work provides emotional and practical support that enhances engagement and facilitates the exchange and testing of ideas.

3.9 Long term success in mathematics depends on the ability to mentally perform routine calculations with fluency and accuracy. These skills, and the accompanying understanding of number concepts and quantities, can be developed through the frequent playing of games that require mental calculations. Fluency and accuracy in the performance of mental calculations should be consolidated through short, individualized, repetition and practice activities such as drills conducted on a daily basis. Whole class chanting and choral response of memorized procedures and tables is less effective and its use should be minimized.
Goals of Primary Mathematics
4.1 By the end of the primary mathematics program, students will:
(i) have constructed mathematical meaning through active engagement;
(ii) have encountered experiences that enable them to confidently apply mathematical concepts in academic and real world situations;
(iii) be able to apply reasoning skills to explore, test, and evaluate mathematical concepts;
(iv) be able to draw conclusions based on the collection, recording and analysis of real world data.
(v) be able to communicate information using appropriate mathematical language;
(vi) appreciate the value of and feel confident about mathematics;
(vii) have the capacity to use technology effectively for mathematical purposes.

Principles of Assessment for Primary Mathematics
5.1 Assessment should reflect how students learn mathematics.
5.2 Assessment should align with the concepts and skills described in the learning outcomes. Teachers should evaluate the extent to which students have attained the skills and competencies described in the relevant learning outcomes at the end of each unit and grade level.
5.3 Information from both summative and formative assessments should be used to monitor and report on student learning. Results from assessments should be used to diagnose learning issues and determine what students need to do next. Assessments that focus on evaluating students’ understanding of processes, as opposed to the production of results, should be regarded as valid and reliable. For example, the use of observational checklists provides insights into student learning and growth as they demonstrate the steps required to solve problems.
5.4 Assessments should help develop students’ confidence. Although expectations of student achievement should be high yet realistic, assessments that elevate mathematical anxiety should be avoided.
5.5 Assessments should focus on understanding of fundamental mathematical concepts rather than the replication of memorized procedures. This can often be achieved through the use of word problems that require students to apply skills and concepts in a range of situations drawn from the real world.
5.6 Assessments should usually require students to clearly explain the process by which they arrived at an answer. Credit should be given for the demonstration of step taken.
5.7 Assessment of the language and symbols of mathematics should be a routine part of students’ experiences.
5.8 A range of formal and informal assessment techniques are required for the thorough evaluation of mathematical competence. Assessments that use alternatives to pen and paper should be a frequent part of students’ experience of mathematics. Teachers can use observational checklists to evaluate and assign a grade to students’ use of mathematical processes.
Content Overview

Statutory Requirements

Content is categorized, defined and described using a system of strands, content standards and learning outcomes. Strands organize content into a set of related topics. The strands are the same at all levels of the curriculum. Each strand is supported by several content standards. These describe the concepts and skills for a particular topic that students are expected to have attained by the end of primary school. Each content standard has a title and accompanying description. Content standards are subdivided into grade level learning outcomes. Each learning outcome describes concepts and skills the students are expected to acquire by the end of the specified grade level. Learning outcomes indicate for teachers the scope and instructional sequence of curriculum content.

Curriculum Strands

Primary mathematics is organized into three strands as follows:

<table>
<thead>
<tr>
<th>Strand</th>
<th>Strand Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Numbers and Number Operations</td>
<td>Numbers and Number Operations develops sense of number, comprehension of numbers and operations and ability to accurately and fluently perform written and mental calculations. Students count in various ways and compare numbers and quantities. They recognize, represent, read, write, compose and decompose numbers in order to solve problems using numerical relations. Students develop the conceptual knowledge underlying the four arithmetic operations of addition, subtraction, multiplication, and division and use these operations to solve real life problems using whole numbers, fractions and decimals.</td>
</tr>
<tr>
<td>2 Spatial Relationships and Shapes</td>
<td>Spatial Relationships and Shapes develops the concepts of traditional geometry, including the ability to construct, recognize, visualize, represent and transform two-dimensional shapes and three-dimensional objects. The quantitative properties of shapes and objects are measured and explored using both the customary and metric systems. Skills associated with identifying, describing, communicating, measuring and calculating time and intervals of time are developed</td>
</tr>
<tr>
<td>3 Data Handling</td>
<td>Data handling includes the concepts of collecting, representing and analysing a range of data types from real life contexts in order to solve a particular problem or question. It allows students to make sense of information and to identify patterns and trends. Concepts of chance and probability and the ability to use and communicate real world statistical information are developed</td>
</tr>
</tbody>
</table>
### Content Standards for Numbers and Number Operations

<table>
<thead>
<tr>
<th>CS #</th>
<th>CS Title</th>
<th>By the end of primary school, students are expected to be able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Numbers</td>
<td>Describe quantities in real world situations using positive and negative numbers, the place-value system, fractions, and decimal numbers in practical contexts.</td>
</tr>
<tr>
<td>2</td>
<td>Patterns</td>
<td>Apply knowledge of repeating, increasing, decreasing and alternating numerical, graphical and other patterns.</td>
</tr>
<tr>
<td>3</td>
<td>Addition and Subtraction</td>
<td>Solve problems by adding and subtracting multi-digit positive and negative numbers with and without decimals.</td>
</tr>
<tr>
<td>4</td>
<td>Multiplication and Division</td>
<td>Solve problems by multiplying and dividing multi-digit positive and negative numbers with and without decimals.</td>
</tr>
<tr>
<td>5</td>
<td>Fractions and Decimals</td>
<td>Solve problems by identifying, comparing, sequencing, adding, subtracting, multiplying and dividing fractions and decimals.</td>
</tr>
<tr>
<td>6</td>
<td>Algebra</td>
<td>Solve problem by representing and recording algebraic patterns, structures and rules in a variety of ways.</td>
</tr>
</tbody>
</table>

### Content Standards for Spatial Relationships and Shapes

<table>
<thead>
<tr>
<th>CS #</th>
<th>CS Title</th>
<th>By the end of primary school, students are expected to be able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Geometry</td>
<td>Recognize, draw, construct, and identify the attributes of and relationships between a range of two-dimensional shapes and three-dimensional objects.</td>
</tr>
<tr>
<td>8</td>
<td>Measurement</td>
<td>Describe, estimate, measure and solve problems in relation to distance, mass, weight, capacity, volume, area and time in real-life situations using both the customary and metric systems.</td>
</tr>
</tbody>
</table>
Content Standards for Data Handling

<table>
<thead>
<tr>
<th>CS #</th>
<th>CS Title</th>
<th>By the end of primary school, students are expected to be able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Coordinate Graphs</td>
<td>Plot points, represent shapes and interpret data using all four quadrants of a coordinate graph.</td>
</tr>
<tr>
<td>10</td>
<td>Sets</td>
<td>Categorize items into groups based on their attributes to make comparisons and communicate information about real world situations.</td>
</tr>
<tr>
<td>11</td>
<td>Data</td>
<td>Collect, record, interpret and communicate data from real world contexts.</td>
</tr>
</tbody>
</table>

Learning Outcomes for Primary Mathematics

Learning outcomes describe concepts and skills the students are expected to acquire by the end of the specified grade level. Learning outcomes indicate for teachers the scope and instructional sequence of curriculum content.

On the following pages, the learning outcomes are presented in an annual planning framework that clusters the learning outcomes into twelve groupings for unit planning. There are four of these “units” per term and each one is expected to require either two or three weeks to deliver.

The annual planning framework presents the learning outcomes in a recommended instructional sequence. Teachers may vary the order of the units and they may vary the order in which the learning outcomes in each unit are presented. Moving learning outcomes from one unit to another is not recommended.

Relevant learning outcomes should be cited on all instructional plans. Instructional materials, strategies and assessment should align with the stated learning outcome.
National Curriculum for Primary Schools

Learning Outcomes for Mathematics

Ordered by Grade Level

2020 Edition

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Learning Outcomes for Primary Mathematics Infant 1

**Numbers A**

1.1 Count groups of objects, initially to 10 and then beyond, using the counting principles of stable order, one-to-one correspondence and cardinality.

1.2 Demonstrate different ways of counting through oral exercises such as playing games, singing songs, and saying rhymes.

1.3 Match groups of up to ten objects to written numerical symbols.

**Numbers B**

1.4 Count groups of objects, initially to 10 and then beyond, using the counting principles of abstraction and order irrelevance.

1.5 State how many objects are in a group of up to 10 objects at a glance without having to count them one by one.

1.6 Identify an individual number, a sequence of numbers and the number before, after or between given numbers on a number line.

1.7 Recite the numbers 1 to 30 in sequence with fluency and accuracy.

**Numbers C**

1.8 Compare numbers from 0 to 10 using the less than, greater than and equals signs.

1.9 Write the numeric symbols for numbers from 0 to 10.

1.10 Compose and decompose numbers from 1 to 10, grouping items into given numbers with no remainder.

1.11 Identify the position of an item in a group using ordinal numbers from first to tenth.

**Geometry A**

7.1 Find examples of points, lines, squares, circles, rectangles and triangles in the classroom, school and wider environment.

7.2 Explore common shapes through play and the use of manipulatives.

7.3 Describe the properties of triangles, squares and rectangles in terms of the number of sides and corners.

7.4 Construct 2-D shapes using straws, sticks, clay, building blocks and other materials.

**Patterns**

2.1 Find examples of patterns in the classroom, school and wider environment.

2.2 Sort objects and shapes based on their colour, size, number of sides or another attribute.

2.3 Create patterns using objects, actions, shapes, colours, sounds or numbers.

2.4 Group 10 or fewer objects into sets of 2's, 3's, 4's and 5's without remainders.

2.5 Count objects, initially to 10 and then beyond, by 1s and 2s, forwards and backwards.
Learning Outcomes for Primary Mathematics Infant 1

Measurement A
8.1 Compare the length, height, mass, temperature and capacity of two objects using words such as longer, taller, shorter, lighter, heavier, colder, hotter, more full or emptier.
8.2 Investigate the length of objects found in the classroom or wider environment, in non-standard units of measurement, such as finger lengths, pieces of string or lengths of a pencil.
8.3 Describe the position of two objects relative to each other in terms of distance and direction using phrases such as near to, far from, very far from, to the right of, below, above and so on.

Measurement B - Time
8.4 Describe the passage of time using terms such as minute, hour, day, week, month and year.
8.5 Correctly sequence the days of the week and months of the year using ordinal numbers.
8.6 Identify the current dates and days of the month on a calendar or weather chart using ordinal numbers.
8.7 Tell time to the hour using an analogue clock.

Addition and Subtraction A
3.1 Add sets of up to ten objects including with the use of zero when adding.
3.2 Solve problems involving addition of up to 10 objects, using real life situations.

Fractions and Decimals
5.1 Explain that a whole object can be divided into parts of equal and different sizes.
5.2 Describe fractions in everyday situations by using language such as ‘1 out of 2’.
5.3 Compose and decompose a region, shape or set of objects using halves and quarters, recognizing that the fractional parts are equal.
5.4 Match pictures of halves and quarters and objects in parts with the symbols ½ and ¼.

Geometry B
7.5 Identify rays, angles and planes in the classroom, school and wider environment.
7.6 Find examples of 3-D objects such as spheres, cubes, cylinders and cones in the classroom, school and wider environment.
7.7 Construct 3-D shapes and objects using straws, sticks, clay, building blocks and other materials.

Addition and Subtraction B
3.3 Subtract objects, including zero objects, from a set of up to ten.
3.4 Solve problems involving subtraction of up to 10 objects, using real life situations.
3.5 Add and subtract sets of up to ten objects with and without the use of concrete objects.
3.6 Combine, rearrange and separate objects to show addition and subtraction, including with the use of +, - symbols.
Learning Outcomes for Primary Mathematics Infant 1

Data
11.1 Gather data from environment through observation, counting, sorting and grouping of items such as objects and pictures.

11.2 Organize and display data using concrete materials in tally charts and on pictorial representations.

11.3 Interpret information presented in pictographs using a variety of data sets.

There are no learning outcomes for Multiplication and Division for infant one students.

There are no learning outcomes for Algebra for infant one students.

There are no learning outcomes for Coordinate Graphs for infant one students.

There are no learning outcomes for Sets for infant one students.
Learning Outcomes for Primary Mathematics Infant 2

Numbers A
1.12 Count up to 100 using a number chart.
1.13 Count groups of up to one hundred objects using the five counting principles of stable order, one-to-one correspondence, cardinality, abstraction and order irrelevance.
1.14 Match number names and numeric symbols for numbers from 0 to 100 both orally and in writing.
1.15 Apply the concept of zero to real-life situations.
1.16 Identify the position of an item in a group using ordinal numbers from first to one hundredth.
1.17 Distinguish between odd and even numbers.

Numbers B
1.18 Compose 2-digit numbers from groups of tens and ones.
1.19 Decompose 2-digit numbers into groups of tens and ones.
1.20 Sequence a set of numbers between 0 and 100, in ascending or descending order, using a number line.
1.21 Identify the number that is ten more or ten less than a given number using a place value chart.
1.22 Estimate to the closest benchmark number, for example, 5, 10, 25 or 50 before counting a set of objects to find the exact amount.
1.23 Sequence a set of non-consecutive numbers between 0 and 100 using a place value chart.
1.24 Compare numbers from 0 to 100 using the less than, greater than and equals signs.

Geometry A
7.8 Draw lines, rays and angles.
7.9 Differentiate between horizontal, vertical and diagonal lines.
7.10 Identify the similarities and differences between triangles, squares, rectangles and circles.
7.11 Create by drawing or modelling 2-D shapes with a specified number of sides.

Patterns
2.6 Identify patterns in pictures and artistic designs.
2.7 Create repeating patterns using actions, objects, colours, and sounds
2.8 Create repeating patterns using shapes, letters and numbers.
Learning Outcomes for Primary Mathematics Infant 2

Measurement A
8.8 Investigate the perimeter and area of 2-D shapes using non-standard measures.
8.9 Measure the length of lines, perimeter of shapes and real objects found in the environment using the customary units of feet and inches.
8.10 Investigate the volume of 3-D shapes using non-standard units of measurement.
8.11 Measure volume of containers using the customary units of cups and pints.
8.12 Measure the mass of objects using the customary units of pounds and ounces.
8.13 Compare the use of non-standard units to the use of customary units of measurement.

Addition and Subtraction A
3.7 Add a 1-digit number to a 2-digit number that ends in a zero.
3.8 Add a 1-digit number to any 2-digit number with the answer not exceeding 99.
3.9 Add, mentally, without the use of manipulatives, multiples of 10, with the sum not exceeding 100.
3.10 Subtract a 1-digit number from a 2-digit number without the need to borrow.

Measurement B - Time
8.14 Identify time as half hour, quarter hour to or past the hour using an analogue clock.
8.15 Apply the terms a.m. and p.m. to time
8.16 Explore the relationship between seconds, minutes, hours, days, weeks and a year.
8.17 Identify how many seconds have passed using the second hand of an analogue clock.
8.18 Identify the time to the nearest minute using both analogue and digital clocks.

Addition and Subtraction B
3.11 Add any two 2-digit numbers together with the answer not exceeding 100, vertically and horizontally with or without the use of a place value chart.
3.12 Subtract a single or 2-digit number from a 2-digit number, vertically and horizontally, without the need to borrow, with or without the use of a place value chart.
3.13 Complete number sentences with sums or differences up to 100 using the symbols +,-, =
3.14 Explore the additive identity property, that is if you add a number to 0, then the sum is the same number.

Fractions and Decimals
5.5 Compose and decompose a region, shape or set of objects using halves, thirds, quarters, and fifths.
5.6 Match pictures of fractional parts with the symbols ½, ⅓, ¼, and ⅕.
Learning Outcomes for Primary Mathematics Infant 2

Multiplication and Division
4.1 Place up to 50 objects into groups of equal size.
4.2 Divide groups into equal parts using real objects or pictures.
4.3 Investigate that multiplication is the same as repeated addition.
4.4 Multiply two 1-digit numbers together using manipulatives arranged in groups, multiplication arrays and so on.

Geometry B
7.12 Create models of 3-D shapes and objects with specified properties, such as number of faces.
7.13 Compare 2-D shapes according to specific properties including length of sides, number of vertices and the approximate size of their internal angles.
7.14 Investigate the similarities and differences between symmetrical shapes.

Data
11.4 Gather data from picture and written sources and the environment through observation.
11.5 Organize and display data using concrete materials in tally charts and column representations.
11.6 Interpret information presented in simple column graphs using a variety of data sets
11.7 Make predictions using graphs.

There are no learning outcomes for Algebra for infant two students

There are no learning outcomes for Coordinate Graphs for infant two students.

There are no learning outcomes for Sets for infant two students.
Learning Outcomes for Primary Mathematics Standard 1

Numbers
1.25 Apply the concept of thousands to real life situations.
1.26 Read, write and match numbers up to 1000 using numerical symbols and words.
1.27 Draw a segment of a number line to show a selection of positive numbers up to 1000.
1.28 Explain that each column of a place value chart is ten times more or less than the neighbouring column for numbers between 0 and 999.
1.29 Compare numbers up to 1000 using the symbols for equals (=), less than (<) and greater than (>).
1.30 State, read and write numbers in expanded form, up to 1000.

Patterns
2.9 Sequence non-consecutive positive numbers between 0 and 1000 in ascending and descending order, using the number line.
2.10 Identify the next, or a missing, object, action, shape, colour, sound or number in a series.
2.11 Create increasing, decreasing and alternating patterns using objects, actions, shapes, colours, sounds or numbers.
2.12 Describe increasing, decreasing and alternating number patterns and patterns of real objects, actions, sounds, colours and shapes.
2.13 Count forward and backward by 2’s, 5’s, 10’s and 100’s from any given starting number between 0 and 1000.

Geometry
7.15 Describe horizontal, vertical, diagonal, intersecting, parallel and perpendicular lines.
7.16 Draw common shapes with specified lengths of sides using a ruler.
7.17 Investigate how the perimeter of common shapes such as triangles, squares and rectangles is calculated.
7.18 Create compound shapes using manipulatives such as pattern blocks, sticks, straws, string or other materials.
7.19 Describe 3-D figures such as cones, cylinders, cubes, cuboids and pyramids.

Addition and Subtraction A
3.15 Add 2-digit numbers without regrouping using a range of mental and written strategies.
3.16 Subtract 2-digit numbers without regrouping using a range of mental and written strategies.
3.17 Add 2-digit numbers with regrouping using manipulatives such as base ten blocks or lego.
3.18 Subtract 2-digit numbers with regrouping using manipulatives such as base ten blocks or lego.
3.19 Add three 2-digit numbers with and without regrouping in unit columns.
Learning Outcomes for Primary Mathematics Standard 1

Measurement A
8.19 Measure, compare and record the length of lines, distances and the size of objects using the customary units of inches, feet and yards.
8.20 Measure, compare and record the mass of various objects in the customary units of pounds and ounces.
8.21 Measure, compare and record the capacity of a container using the customary units of cups, pints, quarts and gallons.
8.22 Estimate the length, mass and capacity of objects before accurately measuring them.

Addition and Subtraction B
3.20 Show the relationship between addition and subtraction.
3.21 Add two 3 digit numbers without regrouping using unit columns.
3.22 Subtract two 3 digit numbers without regrouping using unit columns.
3.23 Add two 3-digit numbers with regrouping using manipulatives such as base ten blocks.
3.24 Subtract two 3-digit numbers with regrouping using manipulatives such as base ten blocks.

Measurement B
8.23 Convert among units within the customary system of length, mass and capacity.
8.24 Convert a length of time between minutes and seconds.
8.25 Identify the temperature of the environment, in either degrees Celsius or Fahrenheit, by using a thermometer with a scale.

Multiplication and Division A
4.5 Multiply, mentally, 1-digit numbers by 2, 3, 4, 5, and 10 with automaticity.
4.6 Explore the multiplicative identity of a number, that is if you multiply a number by 1, the product is that original number.
4.7 Round-off to the nearest ten to estimate when multiplying.
4.8 Multiply a 2-digit number by a 1-digit number.

Fractions and Decimals
5.7 Describe parts of a whole or of a set using fractions with numerators other than one, such as, 2/3, 3/4, 2/5, 5/6, 4/10.
5.8 Compare and sequence fractions with like denominators with the aid of pictures, the number line, fraction strips or other manipulatives.
5.9 Add two or more proper fractions with like denominators.
5.10 Convert fractions with tenths to decimals; for example 3/10 is the same as 0.3
5.11 Add and subtract numbers with one decimal place.
5.12 State, read and write decimals to one decimal place.
Learning Outcomes for Primary Mathematics Standard 1

Multiplication and Division B

4.9 Represent multiplication problems both horizontally and vertically.

4.10 Read and write multiplication number sentences that include the symbols x and =.

4.11 Multiply numbers by using a 12 by 12 chart.

Multiplication and Division C

4.12 Investigate that division is the same as repeated subtraction.

4.13 Divide single and 2-digit numbers by 2, 3, 4, 5, 10, without remainders.

4.14 Read and write division number sentences that include the symbols ÷ and =.

4.15 Show the relationship between multiplication and division.

4.16 Solve word problems with real life applications using multiplication and division.

Data

11.8 Collect data in real life situations.

11.9 Represent data contained in a tally chart or frequency table using pictographs and bar graphs.

11.10 Analyse a tally chart of real life events that are based on chance.

11.11 Discuss situations that involve chance such as certain, impossible or equally likely events.

11.12 Investigate probability using tables and graphs.

There are no learning outcomes for Algebra for standard one students.

There are no learning outcomes for Sets for standard one students

There are no learning outcomes for Coordinate Graphs for standard one students.
Learning Outcomes for Primary Mathematics Standard 2

Numbers
1.31 Identify the value of a digit based on its position in a number up to 5 digits.
1.32 Apply numbers up to 100,000 using numerical symbols and words to real life situations.
1.33 Sequence a set of non-consecutive numbers in ascending and descending order up to 100,000 using the place value system.
1.34 State, read and write numbers up to 100,000 in expanded form.
1.35 Round whole numbers up to 100,000 to specific place values.

Measurement
8.26 Measure, compare and record the length of lines and the size of objects using metres, centimetres and millimetres.
8.27 Compare the distances to and from various places using kilometres.
8.28 Measure, compare and record the mass of various objects using kilograms and grams.
8.29 Measure, compare and record the capacity of a container using litre and millilitre.
8.30 Record temperature using a thermometer with a Celsius scale.
8.31 Record measures of time using minutes, seconds and hours.
8.32 Convert time from minutes to hours, hours to days and days to weeks.

Geometry A
7.20 Identify 2-D shapes with up to 10 sides.
7.21 Identify lines of symmetry in plane figures.
7.22 Draw circles of various sizes using a compass.
7.23 Identify the centre, radius, diameter and circumference of a circle.
7.24 Calculate the perimeter of common shapes such as triangles, squares and rectangles by adding the lengths of all sides using metric units.

Addition and Subtraction
3.25 Add and subtract positive numbers up to 5-digits, with and without regrouping.
3.26 Complete number sentences using mixed operations of addition and subtraction.
3.27 Explain the commutative property of addition.
3.28 Solve problems using the commutative property of addition.
Learning Outcomes for Primary Mathematics Standard 2

Data
11.13 Represent data collected by students on a bar graph and a pictograph.
11.14 Represent data collected by students on a dot plot.
11.15 Determine the median for a given set of data with an odd number of elements.
11.16 Determine the range of a given set of data.
11.17 Determine the mode of a given set of data.
11.18 Identify the probability that an event will happen in a situation with a finite number of possible outcomes using the phrase "with a probability of x out of y".

Multiplication and Division A
4.17 Multiply, mentally, numbers from 0 to 12 with automaticity.
4.18 Multiply two 2-digit numbers without regrouping.
4.19 Multiply two 2-digit numbers with regrouping.
4.20 Multiply a whole number by a number with one decimal place.
4.21 Explain why the commutative property applies to multiplication.
4.22 Find multiples of a whole number.

Fractions and Decimals A
5.13 Identify equivalent fractions using pictures, number line, fraction strips or other manipulatives.
5.14 Find a fraction that is equivalent to another by multiplying both the numerator and the denominator by the same number.
5.15 Compare and sequence groups of proper fractions with unlike denominators.
5.16 Add and subtract proper fractions with like denominators.

Patterns
2.14 Create a two dimensional pattern design using only pictures.
2.15 Explain the difference between odd and even numbers.
2.16 Explain the difference between prime and composite numbers.
2.17 Generate a series of items based on a pattern rule.
2.18 Identify the pattern rule for a given pattern.
2.19 Explore patterns for triangular numbers, multiples and factors.
2.20 Identify missing elements of a pattern using a pattern rule.
Learning Outcomes for Primary Mathematics Standard 2

Multiplication and Division B

4.23 Explore divisibility rules for division by 2, 5, and 10.

4.24 Divide, mentally and with automaticity, 1-digit and 2-digit numbers by 2, 3, 4, 5, & 10, without remainders.

4.25 Identify the remainder after objects are divided into groups.

4.26 Divide 1-digit and 2-digit numbers by 2, 3, 4, 5, & 10, with remainders.

4.27 Divide 2-digit numbers by 1-digit numbers, using the short form of division without carrying over within the calculation.

Fractions and Decimals B

5.17 Add proper fractions with unlike denominators using the area model.

5.18 Subtract proper fractions with unlike denominators using area model.

5.19 Multiply proper fractions with unlike denominators using area model.

5.20 Divide proper fractions with unlike denominators using area model.

Fractions and Decimals C

5.21 Identify the value of any digit in a number that has up to 2 decimal places using the decimal place value chart.

5.22 State, read and write decimal numbers up to 2 decimal places in expanded form.

5.23 Round-off numbers with 2 decimal places to the nearest tenth.

5.24 Compare and sequence groups of decimal numbers up to 2 decimal places using pictures, number line, a place value chart or other manipulatives.

5.25 Identify the equivalent decimal forms of 1/4, 1/2 and 3/4.

5.26 Add and subtract decimal numbers, up to 2 decimal places.

Geometry B

7.25 Construct 3-D figures from given nets.

7.26 Identify the figure of a given net.

7.27 Describe turns using quarter, half, three-quarter and full turn and 0°, 90°, 180°, 270°, 360°.

7.28 Classify an angle as acute, right, obtuse or straight based on the approximate size of the angle.

There are no learning outcomes for Algebra for standard two students.

There are no learning outcomes for Coordinate Graphs for standard two students.

There are no learning outcomes for Sets for standard two students.
Learning Outcomes for Primary Mathematics Standard 3

Numbers
1.36 Identify the value of a digit based on its position in a number up to 7 digits.
1.37 Apply a range of numbers from the very small to the very large, using both numerical symbols and words, to real life situations.
1.38 Round off using an appropriate method to record the answer to a problem.
1.39 Read and write numbers using the Maya numbering system.
1.40 Read and write numbers using the Roman numbering system.
1.41 Explore real life applications of square numbers.

Measurement
8.33 Estimate, using metric units, length, mass, and capacity of a line or object.
8.34 Measure and record length, mass, capacity, and temperature, using metric units, including decimals.
8.35 Solve problems using metric units of length, mass, capacity and temperature in real life situations.
8.36 Estimate the length of time an event takes.
8.37 Measure the elapsed time of an event using a stopwatch to the nearest tenth of a second.
8.38 Calculate the elapsed time of events that are many weeks, months or years apart.
8.39 Convert between a 12-hour clock and a 24-hour clock.

Geometry A
7.29 Measure the degrees of an angle using a protractor.
7.30 Measure the interior angles of various shapes using a protractor.
7.31 Identify a triangle as being acute, obtuse or right-angle based on measurement of its angles.
7.32 Draw angles using a ruler and a protractor.

Addition and Subtraction
3.29 Explain the associative property of addition.
3.30 Solve problems using the associative property of addition.
3.31 Add and subtract very large numbers, with and without regrouping.

Data
11.19 Determine the median for a given sets of data with either an even or an odd number of elements.
11.20 Determine the median, mode, and range of a set of data students have collected.
11.21 Solve real world problems involving median, mode and range.
11.22 Compute the mean for a set of numbers related to real-life situations.
11.23 Describe and predict outcomes from data using the language of chance or likelihood.
11.24 Determine probability from data given in bar graphs and pictographs.
Learning Outcomes for Primary Mathematics Standard 3

Multiplication and Division A
4.28 Explain the associative property of multiplication.
4.29 Solve problems using the associative property of multiplication.
4.30 Demonstrate the squares of numbers up to 10, concretely and pictorially.
4.31 Find lowest common multiples of two or more whole numbers.
4.32 Multiply a 3-digit number by a 1-digit or 2-digit number.
4.33 Multiply a whole number with a number with up to three decimal places.

Fractions and Decimals A
5.27 Reduce a proper fraction to its simplest form.
5.28 Construct mixed numbers from whole numbers and proper fractions.
5.29 Compare and sequence a group containing both mixed numbers and improper fractions.
5.30 Identify the mixed number that is equivalent to a given decimal.
5.31 Add and subtract mixed numbers.
5.32 Multiply and divide mixed numbers.

Patterns
2.21 Investigate different ways to arrange a set of items to create a variety of patterns.
2.22 Create a design using tessellations.
2.23 Solve problems involving the identification of missing elements in a pattern by investigating the difference between successive members.
2.24 Solve problems involving the identification of missing elements in a pattern by investigating the relationship between successive elements using addition, subtraction, multiplication and division.
2.25 Investigate tesselations of geometrical shapes.

Multiplication and Division B
4.34 Explore divisibility rules for division by 3, 6, and 9.
4.35 Divide 2-digit numbers by 1-digit numbers, using the short form of division including carrying over within the calculation.
4.36 Divide 3 and 4-digit numbers by 1-digit numbers, using the short form of division including carrying over within the calculation.
4.37 Divide a number with up to 2 decimal places by a single digit number using the short form of division.
4.38 Find the factors of a range of whole numbers.
4.39 Find the greatest common factor of two whole numbers.
Learning Outcomes for Primary Mathematics Standard 3

Fractions and Decimals B
5.33 Identify the value of any digit in a number with up to 3 decimal places using a place value chart.
5.34 State, read and write decimal numbers up to 3 decimal places in usual and expanded form.
5.35 Compare and sequence groups of decimal numbers up to 3 decimal places.
5.36 Round-off numbers with 3 decimal places to the nearest tenth and hundredth.
5.37 Add and subtract decimal numbers, up to 3 decimal places.
5.38 Convert fractions that have 2, 4, 5, 8, 10, 20, 25 or 50 as the denominator to decimal numbers.

Sets
10.1 Place elements in a set based on common characteristics.
10.2 Describe a set by analysing the common features of the elements within it.
10.3 Identify elements that are not members of a set.
10.4 Describe the intersection of two sets by examining a Venn diagram.
10.5 Determine if a set is empty (null).
10.6 Describe sets using the following set notations: ∈, { }, ∩, ∅.

Geometry B
7.33 Calculate the perimeter of a compound shape with one or more measurement missing.
7.34 Derive the area of a shape by using an overlay grid.
7.35 Calculate the area of a triangle using the formula half the base x height.
7.36 Calculate the area of a rectangle using the formula length x width.

There are no learning outcomes for Algebra for standard three students.

There are no learning outcomes for Coordinate Graphs for standard three students.
Learning Outcomes for Primary Mathematics Standard 4

Numbers A
1.42 Read and write positive and negative integers using a number line.
1.43 Construct a number line that shows both positive and negative numbers.
1.44 Sequence positive and negative numbers in ascending and descending order, using a number line.
1.45 Apply the concept of negative numbers to real life situations.
1.46 Round off a number to a specified number of significant figures.

Geometry
7.37 Classify triangles using the terms equilateral, isosceles, scalene, right-angle, acute, and obtuse.
7.38 Draw triangles with given angles and lengths of side using a ruler and protractor.
7.39 Investigate relationships between the interior angles and exterior angles of a triangle.
7.40 Construct circles showing radii and diameters.
7.41 Calculate the area of a compound shape.
7.42 Calculate the volume of a cuboid using the formula length x width x height.

Addition and Subtraction
3.32 Add a positive number to a negative number.
3.33 Subtract a positive number from a negative number.
3.34 Add a negative number to a positive number.
3.35 Subtract a negative number from a positive number.
3.36 Add a negative number to a negative number.
3.37 Subtract a negative number from a negative number.

Multiplication and Division B
4.40 Explain, how the use of brackets can change the order of operations in problems involving multiplication and addition or subtraction.
4.41 Multiply two decimal numbers together.
4.42 Multiply a positive number with a negative number.

Fractions and Decimals A
5.39 Demonstrate the steps to find lowest common denominator of two or more fractions.
5.40 Add two or more fractions with unlike denominators using lowest common denominator.
5.41 Subtract two or more fractions with unlike denominators using lowest common denominator.
5.42 Solve real world problems that require the adding or subtracting of mixed numbers.
5.43 Solve real world problems that require the multiplying or dividing of mixed numbers.
5.44 Solve real world problems involving fractions that require the use of more than one types of operation.
Learning Outcomes for Primary Mathematics Standard 4

Coordinate Graphs
9.1 Locate a given square on a grid based on a reference.
9.2 Find a grid square on a map using coordinates.
9.3 Locate points on the first quadrant of a coordinate graph.
9.4 Plot common shapes on the first quadrant of a coordinate graph using given ordered pairs.
9.5 Create line on a graph using a series of positive ordered pairs on a coordinate graph.

Data
11.25 Construct a line graph using real life data.
11.26 Extract information from a line graph showing real-life data.
11.27 Describe trends from line graphs.
11.28 Construct frequency tables from given data.
11.29 Construct circle graphs and bar graphs from frequency tables.
11.30 Extract information from circle graphs showing real-life data.

Fractions and Decimals B
5.45 Identify common everyday situations where percent is used.
5.46 Identify that a given percentage is equivalent to a fraction with a denominator of 100.
5.47 Investigate the relationship between percentages and fractions.
5.48 Represent various percentages using pictures, pie charts, parts of a cylinder and so on.
5.49 Describe real life situations involving comparisons between percentages.

Measurement
8.40 Investigate the relationship between the metric and customary units of measurement by measuring the length of same line or object using both systems.
8.41 Investigate the relationship between the metric and customary units of measurement by weighing the same object using both systems.
8.42 Investigate the relationship between the metric and customary units of capacity by finding the capacity of the same container both systems.
8.43 Solve problems in which one of starting time, ending time and elapsed time is an unknown quantity.
8.44 Solve real life problems involving calculating speed from known quantities of distance and time.
Learning Outcomes for Primary Mathematics Standard 4

Multiplication and Division A

4.43 Divide a whole number by a decimal between 0 and 1.
4.44 Explore divisibility rules for division by 4, 7 and 8.
4.45 Divide a whole number by a 2 digit number using long division.
4.46 Express natural numbers as products of their prime factors.
4.47 Explain how the use of brackets can change the order of operations in problems involving division and addition or subtraction.

Sets

10.7 Identify the elements in the subsets of a set based on a given characteristic.
10.8 Indicate subsets using correct set notation.
10.9 Create venn diagrams to show the union and intersection of two sets.
10.10 Identify the elements in the unions and intersections of two sets based on a venn diagram.
10.11 Describe the elements that are in the union or intersection of two sets using the set notation: \{\}, \cap, \cup.
10.12 Solve real world problems based on the use of venn diagrams.

Numbers B

1.47 Explore the concept of powers using repeated multiplications using 2 as the base number.
1.48 Illustrate the concept of cube numbers concretely and pictorially.
1.49 Construct place value charts for bases 2, 3 and 5.
1.50 Convert to and from base 10 and bases 2, 3 and 5.

There are no learning outcomes for Algebra for standard four students.
Learning Outcomes for Primary Mathematics Standard 5

Counting and Sequencing
1.17  Read and write numbers up to 10,000,000.

Place Value
2.11  Express large numbers using scientific notation.
2.12  Use place value to express numbers in bases other than 10: use bases smaller and larger than 10.

Integers
3.8  Use number line to show positive and negative numbers: integers, decimals and fractions.
3.9  Use negative numbers to solve problems.

Fractions and Decimals
4.14  Recognize equivalent forms of decimal, fraction, percent.

Number Operation Concepts
6.10  Investigate associative, distributive and commutative properties.

Number Operations and Computation
7.13  Perform computation which combine operations: use parenthesis; order of operations; use associative, commutative, distributive properties to simplify operations.
7.14  Identify and work with ratios in real-life problem solving: include working with scales, conversions, percents; simplify ratios.
7.15  Multiply and divide using exponents: develop formal rules to handle indices.

Estimates and Approximations
8.7  Round-off decimals to the nearest hundredth and thousandth.

Mental Math
9.7  Use variety of techniques to simplify multiplication: use factors, for example, 32x6 = (30x6)+(2x6) = 180+12=192); multiply by reciprocal (patterns for fractions with denominator of 7, 9, 11).

Number Patterns
10.9  Describe patterns represented in graphs and series of abstract symbols.

Special Group Numbers
11.11  Explore rational and irrational numbers.
11.12  Investigate arithmetic progressions.

Relations, Functions and Graphs
12.8  Use graphs to represent linear relationships between two variables: first quadrant.

Equations and Inequalities
13.6  Use an equation to represent a generalization arising from some relationship.
13.7  Use an equation to solve a word problem.
13.8  Solve equations with 2 or 3 variables, for example, if v+2=7 and v+2+w=10 then v=5 and w=3; or if p+q=r, and p=3, q=4 then r=7.
Learning Outcomes for Primary Mathematics Standard 5

Measurement Applications
15.23 Compare and sort lengths and mass within and between metric and customary units selecting appropriate unit for various items introduced.
15.24 Understand difference and relationship between weight and mass.
15.25 Investigate how changing dimensions of a figure affect perimeter, area and volume.

Properties of Shapes
16.21 Construct 2-dimensional shapes from specific dimensions for sides, diagonals, diameter, radius, altitude, angles.
16.22 Investigate relationships between interior angles and exterior angles in a triangle.
16.23 Recognize ratio between circumference and diameter of any circle.
16.24 Construct compound 3-dimensional figures.

Representation of Shapes
17.16 Plot on a rectangular grid the results of a reflection and translation.
17.17 Plot points on all four quadrants of a coordinate grid.
17.18 Interpret scale drawings.

Data Collection and Organization
18.15 Construct circle graphs: discuss when circle graphs are appropriate.
18.16 Apply Venn diagrams to three sets.

Data Analysis
19.13 Describe patterns in data including clusters, gaps and outliers.
19.14 Interpret circle graphs and Venn diagrams.

Probability
20.11 Determine probability from data given in tables and graphs.
20.12 Compare theoretical and experimental probability in real-life situations.
Learning Outcomes for Primary Mathematics Standard 6

Counting and Sequencing
1.18 Read and write numbers up to 1,000,000,000.

Place Value
2.13 Express small numbers using scientific notation: every place value is 10x smaller than the place value to the left.
2.14 Use place values to convert between bases: to and from base 10 (bases smaller and larger than base 10); between two bases other than base 10

Integers
3.10 Use negative numbers in the solution of word problems.
3.11 Solve problems involving absolute value.

Fractions and Decimals
4.15 Solve problems involving fractions, decimals and percents.

Number Operations and Computation
7.16 Combine operations that require conversions between types of fractions and decimals.
7.17 Solve problems involving proportions.

Estimates and Approximations
8.8 Use appropriate rounding-off to record solutions to problems: level of accuracy.

Mental Math
9.8 Use shortcuts for multiplying by specific numbers.

Number Patterns
10.10 Describe rule used to complete a pattern based on abstract symbols.

Special Group Numbers
11.13 Investigate number patterns based on single operations.
11.14 Investigate geometric progressions.

Relations, Functions and Graphs
12.9 Use a table of values to graph and interpret linear relations.
12.10 Use graphs to investigate region represented by an inequality.

Equations and Inequalities
13.9 Substitute given values to evaluate an expression.
13.10 Solve simple equations and inequalities.

Measurement Applications
15.26 Solve problems involving perimeter, area, surface area and volume.
Learning Outcomes for Primary Mathematics Standard 6

Properties of Shapes
16.25 Investigate relationship between interior and exterior angles of quadrilaterals and other polygons.
16.26 Apply Pythagoras theorem to right-angle triangles.
16.27 Identify similar and congruent figures.
16.28 Construct polyhedral using nets (2-dimensional patterns).

Representation of Shapes
17.19 Plot on a rectangular grid the results of a rotation.
17.20 Bisect lines and angles: use of a Geometry Set.
17.21 Apply concepts, properties, and relationships of adjacent, corresponding, vertical, alternate interior, complementary, and supplementary angles: figure out a missing angle.

Data Collection and Organization
18.17 Determine appropriate data display method for given situation.
18.18 Construct box plots.
18.19 Collect and represent data from simple random samples.

Data Analysis
19.15 Interpret data from box-plots (box-and-whisker plots).
19.16 Use scatter plot to determine trend.
19.17 Discuss appropriateness of measures of central tendency.
19.18 Investigate how extremes and other factors affect measures of central tendency.
19.19 Interpret data from simple random samples.

Probability
20.13 Make predictions based on data patterns.
20.14 Use tree-diagrams to determine probability of multiple events.