Primary Mathematics

Learning Progression Framework

Levels 1 to 4

As at 29 Nov 2014

Number and Algebra

Dimension: Number and Algebra

Learning Progression Framework		
Level 1	Students understand whole numbers up to 3 digits and solve problems involving addition and subtraction of at most 3-digit whole numbers, as well as multiplication of 1-digit whole numbers.	
Codes	Learning Outcomes	Pointers
NA1.1	Understand whole numbers up to 3 digits	1. Count, read, write and Compare whole numbers up to 3 digits
		2. Identify odd and even numbers
NA1.2	Perform basic operations on whole numbers up to 3 digits	1. Perform addition of whole numbers up to 3 digits (at most two operations and answers should be less than 1 000)
		2. Perform subtraction of whole numbers up to 2 digits (at most two operations)
		3. Perform multiplication of a 1-digit whole number by a 1-digit whole number
NA1.3	Solve simple problems involving addition/subtraction of whole numbers up to 3 digits, or multiplication of 1-digit whole numbers (excluding problems involving comparison)	1. Solve simple problems involving addition of whole numbers up to 3 digits (at most two operations)
		2. Solve simple problems involving subtraction of whole numbers up to 2 digits (at most two operations)
		3. Solve simple problems involving multiplication of a 1-digit whole number by a 1-digit whole number

Dimension: Number and Algebra

Learning Progression Framework		
Level 2 Students understand whole numbers up to 5 digits and fractions and solve problems involving whole numbers up to 4 digits.		
Codes	Learning Outcomes	Pointers
NA2.1	Understand whole numbers up to 5 digits	1. Read, write and Compare whole numbers up to 5 digits
NA2.2	Understand fractions	1. Use fractions to represent a part of one whole and a part of a set of objects
		2. Compare fractions with the same numerator or denominator
NA2.3	Perform operations on whole numbers up to 4 digits	1. Perform addition of whole numbers up to 4 digits
		2. Perform subtraction of whole numbers up to 4 digits
		3. Perform multiplication of a whole number up to 3 digits by a 1-digit whole number
		4. Perform division of a whole number up to 3 digits by a 1-digit whole number
		5. Demonstrate the knowledge of the convention for the order of mixed operations on whole numbers, including – Brackets – Addition and subtraction of whole numbers up to 4 digits (at most two operations) Addition, subtraction and multiplication of whole numbers (at most two operations and multiplication only involves a whole number up to 3 digits by a 1-digit whole number)
NA2.4	Solve simple problems involving whole numbers up	1. Solve simple problems involving addition or subtraction of whole numbers up to 4 digits (at most two operations)

Dimension: Number and Algebra

Learning Progression Framework		
Level 2 Students understand whole numbers up to 5 digits and fractions and solve problems involving whole numbers up to 4 digits.		
Codes	Learning Outcomes	Pointers
	to 4 digits	2. Solve simple problems involving multiplication of a whole number up to 3 digits by a 1-digit whole number (at most two operations)
		3. Solve simple problems involving division of a whole number up to 3 digits by a 1-digit whole number
		4. Solve simple problems involving at most two operations and brackets (addition/subtraction of whole numbers up to 4 digits, multiplication of a whole number up to 3 digits by a 1-digit whole number)

Dimension: Number and Algebra

Learning Progression Framework		
Level 3	Students understand whole numbers up to 1 000 000 000 and the four operations involving whole numbers. Understand fractions and decimals. Solve problems involving whole numbers up to 4 digits. Solve problems involving addition, subtraction and multiplication of fractions.	
Codes	Learning Outcomes	Pointers
NA3.1	Understand whole numbers up to 1 000 000 000	1. Read, write and Compare whole numbers up to 1 000 000 000
		2. Estimate the number of a large quantity of objects
		3. Round off large numbers (up to 1 000 000 000) in thousands, ten thousands, hundred thousands, millions, ten millions or hundred millions
NA3.2	Comprehend fractions	1. Identify proper fractions, improper fractions, mixed numbers and equivalent fractions
		2. Convert a fraction into an equivalent fraction
NA3.3	Comprehend decimals	1. Convert between decimals and fractions with denominators equal to 10, 100 or 1 000.
		2. Compare decimals up to 2 decimal places
		3. Apply decimals in daily life situations
NA3.4	Find multiples and factors	1. Find the multiples of a whole number
		2. Find the common multiples and L.C.M. of two whole numbers by the listing method
		3. Find the factors of a whole number
		4. Find the common factors and H.C.F. of two whole numbers by the listing method

Dimension: Number and Algebra

Learning Progression Framework		
Level 3 Students understand whole numbers up to 1 000 000 000 and the four operations involving whole numbers. Understand fractions and decimals. Solve problems involving whole numbers up to 4 digits. Solve problems involving addition, subtraction and multiplication of fractions.		
Codes	Learning Outcomes	Pointers
NA3.5	Perform operations on whole numbers up to 4 digits	1. Perform multiplication of a whole number up to 3 digits by a 2-digit whole number
		2. Perform division of a whole number up to 3 digits by a 2-digit whole number
		3. Demonstrate the knowledge of the convention for the order of mixed operations on whole numbers (at most four operations)
NA3.6	Perform operations on fractions	1. Perform addition of fractions with denominators not exceeding 12 (at most two operations)
		2. Perform subtraction of fractions with denominators not exceeding 12 (at most two operations)
		3. Perform multiplication of fractions (at most two operations)
NA3.7	Solve problems involving whole numbers up to 4 digits	1. Solve problems involving multiplication of a whole number up to 3 digits by a 2-digit whole number
		2. Solve problems involving division of a whole number up to 3 digits by a 2-digit whole number
		3. Solve problems involving whole numbers with at most four operations (addition/subtraction of whole numbers up to 4 digits, multiplication of a 3-digit whole number by a 2-digit whole number, division of a 3-digit whole number by a 2-digit whole number)
NA3.8	Solve problems involving fractions	1. Solve problems involving addition, subtraction or multiplication of fractions (at most two operations)

Dimension: Number and Algebra

Learning Progression Framework		
Level 4	Students understand whole numbers, fractions, decimals, percentages and their related operations and conversion. Students understand algebraic symbols and equations. Students apply them to solve problems.	
Codes	Learning Outcomes	Pointers
NA4.1	Understand percentages and the relationship among percentages, fractions and decimals (up to 2 decimal places)	1. Represent one quantity as a percentage of another
		2. Perform conversion among fractions, decimals (up to 2 decimal places) and percentages
		3. Compare fractions, decimals and percentages
NA4.2	Perform operations on whole numbers, fractions and decimals (up to 2 decimal places)	1. Perform computation involving addition, subtraction, multiplication or division of decimals up to 2 decimal places (at most three operations)
		2. Perform division of fractions and mixed operations on whole numbers and fractions (at most two operations)
		3. Perform mixed operations on whole numbers and decimals up to 2 decimal places (at most three operations)
NA4.3	Understand elementary algebra	1. Use a symbol to represent an unknown quantity
		2. Use algebraic symbols to represent a quantitative relation
NA4.4	Understand and solve simple equations	1. Solve simple equations involving at most two steps
NA4.5	Solve problems involving	1. Solve problems involving division of fractions, and whole numbers and fractions (at most two

Dimension: Number and Algebra

Learning Progression Framework		
Level 4	Students understand whole numbers, fractions, decimals, percentages and their related operations and conversion. Students understand algebraic symbols and equations. Students apply them to solve problems.	
Codes	Learning Outcomes	Pointers
	whole numbers, fractions, decimals (up to 2 decimal places) and percentages	operations)
		2. Solve problems involving whole numbers and decimals up to 2 decimal places (at most three operations)
		3. Solve problems involving percentages
		4. Formulate equations with data given in the problems
		5. Solve problems using simple equations involving at most two steps

Measures, Shape & Space

Dimension: Measures, Shape & Space

Learning Progression Framework		
Level 1	Students use everyday languages associated with lengths, distances, money and time. They recognise intuitively straight lines, curves, angles, 2-D shapes and 3-D shapes.	
Codes	Learning Outcomes	Pointers
MSS1.1	Compare and measure lengths and distances directly or using appropriate improvised units	1. Compare directly lengths of objects
		2. Measure lengths and distances using appropriate improvised units
		3. Compare lengths and distances using appropriate improvised units
MSS1.2	Recognise Hong Kong Money (coins)	1. Identify Hong Kong Money (coins)
MSS1.3	Read and tell time (minutes and hours)	1. Tell time in hours and minutes with respect to “a.m.” or “p.m.”
		2. Use “morning”, “afternoon”, “noon” or “midnight” to describe parts of a day
		3. Report the duration of time spent on different activities using “hours”(h) and “minutes”(min)
		4. Tell the days of a week and dates
MSS1.4	Recognise 2-D shapes and 3-D shapes	1. Name and identify prisms, cylinders, pyramids, cones, spheres, triangles, quadrilaterals, pentagons, hexagons and circles
		2. Sort and name shapes in terms of certain attributes
		3. Tell the relative positions between two shapes
		4. Make 2-D shapes or 3-D shapes (folding paper, using objects, etc)

Dimension: Measures, Shape & Space

Learning Progression Framework		
Level 1	Students use everyday languages associated with lengths, distances, money and time. They recognise intuitively straight lines, curves, angles, 2-D shapes and 3-D shapes.	
Codes	Learning Outcomes	Pointers
MSS1.5	Recognise straight lines and curves	1. Identify straight lines and curves
		2. Make straight lines and curves
MSS1.6	Recognise and Compare angles	1. Point out angles from an object / a figure
		2. Compare angles of different sizes
MSS1.7	Recognise right angles	1. Point out right angles from an object / a figure
		2. Make angles

Dimension: Measures, Shape & Space

Learning Progression Framework		
Level 2	Students use standard units to describe lengths, distances, weights, capacities, money and time. They use appropriate units in measuring lengths, distances, weights and capacities. They use mathematical terms to describe lines, angles, triangles, quadrilaterals and the four directions.	
Codes	Learning Outcomes	Pointers
MSS2.1	Recognise Hong Kong Money (notes)	1. Identify Hong Kong Money (notes)
		2. Read price tags
		3. Exchange current notes and coins and use money for selling and buying
MSS2.2	Measure and compare lengths and distances in "centimetre" or "metre"	1. Measure lengths and distances in "centimetre"(cm) or "metre"(m) without involving decimals notation
		2. Compare lengths and distances in "centimetre"(cm) or "metre"(m)
		3. Use "ever-ready rulers" to estimate lengths and distances
MSS2.3	Read and tell time (seconds and 24-hour time)	1. Tell time in hours, minutes and seconds, as well as using the 24-hour time
		2. Report the duration of time spent on different activities using "hours and minutes", "minutes and seconds" or "seconds"(s)
MSS2.4	Measure and compare weights using appropriate units	1. Compare directly weights of objects
		2. Use appropriate improvised units, "gram"(g) or "kilogram"(kg) to measure and compare weights of objects
MSS2.5	Measure and compare capacities using appropriate	1. Compare directly capacities of containers
		2. Use appropriate improvised units, "litre"(L) or "millilitre"(mL) to measure and compare capacities

Dimension: Measures, Shape & Space

Learning Progression Framework		
Level 2	Students use standard units to describe lengths, distances, weights, capacities, money and time. They use appropriate units in measuring lengths, distances, weights and capacities. They use mathematical terms to describe lines, angles, triangles, quadrilaterals and the four directions.	
Codes	Learning Outcomes	Pointers
	units	of containers
MSS2.6	Use “kilometre” or “millimetre” to measure and compare lengths and distances	1. Use “millimetre”(mm) to measure and compare lengths and distances
		2. Use “kilometre”(km) to compare distances
		3. Choose appropriate tools to measure lengths and distances
MSS2.7	Recognise the characteristics of triangles and quadrilaterals	1. Identify the characteristics of triangles, squares, rectangles, rhombuses, parallelograms and trapeziums by means of sides and angles
		2. Identify the similarities and differences between squares and rectangles
		3. Make triangles, squares, rectangles, rhombuses and trapeziums
MSS2.8	Recognise the four directions	1. Use a compass to determine the four directions
		2. Determine the four directions with one of them given
		3. Use the four directions to describe the position of an object in relation to another
MSS2.9	Recognise acute and obtuse angles	1. Identify acute and obtuse angles
MSS2.10	Recognise parallel and	1. Identify parallel lines

Dimension: Measures, Shape & Space

Learning Progression Framework		
Level 2	Students use standard units to describe lengths, distances, weights, capacities, money and time. They use appropriate units in measuring lengths, distances, weights and capacities. They use mathematical terms to describe lines, angles, triangles, quadrilaterals and the four directions.	
Codes	Learning Outcomes	Pointers
	perpendicular lines	2. Identify perpendicular lines
		3. Make parallel lines
		4. Make perpendicular lines

Dimension: Measures, Shape & Space

Learning Progression Framework		
Level 3	Students understand perimeters and areas and calculate perimeters and areas of 2-D shapes formed by straight lines. They use mathematical terms to describe quadrilaterals, 8 compass points and symmetrical shapes.	
Codes	Learning Outcomes	Pointers
MSS3.1	Understand perimeters and find perimeters of 2-D shapes	1. Show the perimeter of a figure
		2. Measure and find perimeters of 2-D shapes
MSS3.2	Understand areas and find areas of 2-D shapes	1. Compare directly areas of 2-D shapes
		2. Use appropriate improvised units, "square metre" (m^2) or "square centimetre" (cm^2) to compare and find areas of 2-D shapes
		3. Use appropriate formulas to calculate areas of triangles, squares, rectangles, rhombuses, trapeziums and parallelograms
		4. Fit and dissect 2-D shapes. Find areas of polygons (by dissecting the polygons, compensation method, etc)
MSS3.3	Identify the characteristics of quadrilaterals	1. Identify and compare the basic characteristics of trapeziums, rhombuses and quadrilaterals
		2. Make quadrilaterals
MSS3.4	Understand the 8 compass points	1. Use the 8 compass points to describe the position of an object
		2. Find directions with a compass
MSS3.5	Understand symmetry	1. Identify symmetrical shapes and find the line(s) of symmetry
		2. Make symmetrical shapes

Dimension: Measures, Shape & Space

Learning Progression Framework		
Level 4	Students use mathematical terms to describe circles and 3-D shapes. They understand circumferences, volumes and capacities. They find circumferences, volumes of objects and capacities of containers. They solve simple speed problems.	
Codes	Learning Outcomes	Pointers
MSS4.1	Understand volumes and find volumes of objects	1. Compare volumes of objects intuitively
		2. Compare and measure volumes of objects using "cubic centimetres"(cm^3) or "cubic metres"(m^3)
		3. Apply appropriate formulas to find volumes of cubes and cuboids
		4. Understand that 1 mL equals 1 cm^3
		5. Find volumes of irregular solids by displacement of water
MSS4.2	Understand speeds and solve simple problems	1. Read travel graphs
		2. Apply the formula for speed to solve simple problems
MSS4.3	Understand circumferences	1. Understand the relationship between circumference and diameter and the symbol "π"
		2. Find circumferences
MSS4.4	Identify the characteristics of 3-D shapes	1. Identify the characteristics of prisms, cylinders, pyramids, cones, and spheres
		2. Tell the relationship between the number of edges or vertices with the number of sides of the bases of prisms and pyramids
		3. Make prisms and pyramids (nets, frameworks, etc)
		4. Tell the shapes of different sections in prisms, cylinders, pyramids, cones and spheres

Dimension: Measures, Shape & Space

Learning Progression Framework		
Level 4	Students use mathematical terms to describe circles and 3-D shapes. They understand circumferences, volumes and capacities. They find circumferences, volumes of objects and capacities of containers. They solve simple speed problems.	
Codes	Learning Outcomes	Pointers
MSS4.5	Understand the properties of circles	1. Identify the properties of circles 2. Draw circles by various methods

Data Handling

Dimension: Data Handling

Learning Progression Framework		
Level 1 Students collect and sort data about them. They represent data by objects or pictograms. They read and describe simple pictograms.		
Codes	Learning Outcomes	Pointers
DH1.1	Understand simple pictograms	1. Collect and sort data about students
		2. Read and describe simple pictograms
DH1.2	Represent data using concrete objects or pictograms	1. Represent data about students using concrete objects or a pictogram with a one-to-one representation

Dimension: Data Handling

Learning Progression Framework		
Level 2 Students collect and sort data around them. They represent data by tables and block graphs with a one-to-one representation. They read and describe tables and block graphs. They estimate averages from block graphs.		
Codes	Learning Outcomes	Pointers
DH2.1	Understand block graphs	1. Collect and sort data around students
		2. Read and describe tables and block graphs
DH2.2	Represent data using frequency tables and block graphs	1. Represent data using frequency tables and block graphs with a one-to-one representation
DH2.3	Estimate averages from block graphs	1. Estimate averages from block graphs

Dimension: Data Handling

Learning Progression Framework		
Level 3	Students collect and organise data. They represent data by simple bar charts and pictograms with representations of one-to-one and one-to-hundred, inclusive. They read and describe simple bar charts and pictograms . They estimate averages from simple bar charts.	
Codes	Learning Outcomes	Pointers
DH3.1	Understand simple bar charts and pictograms with greater frequency counts	1. Collect and organise data from both primary and secondary sources
		2. Read and describe simple bar charts (one-to-one, one-to-two, one-to-five or one-to-ten) and pictograms (one-to-one or one-to-hundred)
DH3.2	Represent data using graphs with suitable scales	1. Construct graphs (with suitable scales) i. simple bar charts (one-to-one, one-to-two, one-to-five or one-to-ten) ii. pictograms(one-to-one or one-to-hundred)
DH3.3	Estimate averages from simple bar charts	1. Estimate averages from simple bar charts

Dimension: Data Handling

Learning Progression Framework		
Level 4	Students represent data by suitable graphs. They interpret bar charts and broken line graphs. They estimate and calculate averages for data sets.	
Codes	Learning Outcomes	Pointers
DH4.1	Interpret graphs	1. Interpret graphs with greater frequency counts
DH4.2	Organise and represent data using suitable graphs	1. Collect and organise data of greater frequency counts
		2. Construct and interpret bar charts (simple and compound bar charts, one-to-fifty, one-to-hundred, one-to-thousand, one-to-ten thousand, or one-to-hundred thousand) and broken line graphs
DH4.3	Estimate and calculate averages for data sets	1. Estimate averages from the graphs
		2. Estimate and calculate the average of a set of data
		3. Solve simple problems involving averages