CIPS Math scope and sequence March 2014

Year 4 (8-9s)	Number	Pattern & Function	Measurement	Data Handling	Space and Shape
Overall expectations	Learners will develop the understanding that fractions and decimals are ways of representing whole-part relationships and will demonstrate this understanding by modelling equivalent fractions and decimal fractions to hundredths or beyond. They will be able to model, read, write, compare and order fractions, and use them in real-life situations. Learners will have automatic recall of addition, subtraction, multiplication and division facts. They will select, use and describe a range of strategies to solve problems involving addition, subtraction, multiplication and division, using estimation strategies to check the reasonableness of their answers.	Learners will analyse patterns and identify rules for patterns, developing the understanding that functions describe the relationship or rules that uniquely associate members of one set with members of another set. They will understand the inverse relationship between multiplication and division, and the associative and commutative properties of multiplication. They will be able to use their understanding of pattern and function to represent and make sense of real-life situations and, where appropriate, to solve problems involving the four operations.	Learners will continue to use standard units to measure objects, in particular developing their understanding of measuring perimeter, area and volume. They will select and use appropriate tools and units of measurement, and will be able to describe measures that fall between two numbers on a scale. The learners will be given the opportunity to construct meaning about the concept of an angle as a measure of rotation.	Learners will continue to collect, organize, display and analyse data, developing an understanding of how different graphs highlight different aspects of data more efficiently. They will understand that scale can represent different quantities in graphs and that mode can be used to summarize a set of data. The learners will make the connection that probability is based on experimental events and can be expressed numerically.	Learners will sort, describe and model regular and irregular polygons, developing an understanding of their properties. They will be able to describe and model congruency and similarity in 2D shapes. Learners will continue to develop their understanding of symmetry, in particular reflective and rotational symmetry. They will understand how geometric shapes and associated vocabulary are useful for representing and describing objects and events in real-world situations.
Conceptual understandings	The base 10 place value system can be extended to represent magnitude. Fractions and decimals are ways of representing whole-part relationships. The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems. Even complex operations can be modelled in a variety of ways, for example, an algorithm is a way to represent an operation.	Functions are relationships or rules that uniquely associate members of one set with members of another set. By analysing patterns and identifying rules for patterns it is possible to make predictions.	Objects and events have attributes that can be measured using appropriate tools. Relationships exist between standard units that measure the same attributes.	Data can be collected, organized, displayed and analysed in different ways. Different graph forms highlight different aspects of data more efficiently. Probability can be based on experimental events in daily life. Probability can be expressed in numerical notations.	Changing the position of a shape does not alter its properties. Shapes can be transformed in different ways. Geometric shapes and vocabulary are useful for representing and describing objects and events in real-world situations.
Learner Outcomes	When **constructing meaning** learners: • model numbers to thousands or beyond using the base 10 place value system • model equivalent fractions • use the language of fractions, for example, numerator, denominator • model decimal fractions to	When **constructing meaning** learners: • understand that patterns can be analysed and rules identified • understand that multiplication is repeated addition and that division is repeated subtraction • understand the inverse relationship between	When **constructing meaning** learners: • understand the use of standard units to measure perimeter, area and volume • understand that measures can fall between numbers on a , for example, 3½ kg, between 4 cm and 5 cm	When **constructing meaning** learners: • understand that data can be collected, displayed and interpreted using simple graphs, for example, bar graphs, line graphs • understand that scale can represent different quantities in	When **constructing meaning** learners: • understand the common language used to describe shapes • understand the properties of regular and irregular polygons • understand congruent or similar shapes • understand that lines and axes of

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	hundredths or beyond • model multiplication and division ofwhole numbers • use the language of multiplication and division, for example, factor, multiple, product, quotient, prime numbers, composite number model addition and subtraction of fractions with related denominators*** • model addition and subtraction of decimals.	multiplication and division • understand the associative and commutative properties of multiplication.	• understand relationships between units, for example, metres, centimetres and millimetres • understand an angle as a measure of rotation.	graphs • understand that the mode can be used to summarize a set of data • understand that one of the purposes of a database is to answer questions and solve problems • understand that probability is based on experimental events.	reflective and rotational symmetry assist with the construction of shapes • understand an angle as a measure of rotation • understand that directions for location can be represented by coordinates on a grid • understand that visualization of shape and space is a strategy for solving problems.
	When **transferring meaning into symbols** learners: • read, write, compare and order whole numbers up to thousands or beyond • develop strategies for memorizing addition, subtraction, multiplication and division number facts • read, write, compare and order fractions • read and write equivalent fractions • read, write, compare and order fractions to hundredths or beyond • describe mental and written strategies for multiplication and division.	When **transferring meaning into symbols** learners: • describe the rule for a pattern in avariety of ways • represent rules for patterns using words, symbols and tables • identify a sequence of operations relating one set of numbers to another set.	When **transferring meaning into symbols** learners: • estimate and measure using standard units of measurement: perimeter, area and volume •describe measures that fall between numbers on a scale • read and write digital and analogue time on 12-hour and 24-hour clocks.	When **transferring meaning into symbols** learners: • collect, display and interpret data using simple graphs, for example, bar graphs, line graphs • identify, read and interpret range and scale on graphs •identify the mode of a set of data • use tree diagrams to express probability using simple fractions	When **transferring meaning into symbols** learners: • sort, describe and model regular and irregular polygons • describe and model congruency and similarity in 2D shapes • analyse angles by comparing and describing rotations: whole turn; half turn; quarter turn; north, south, east and west on a compass • locate features on a grid using coordinates • describe and/or represent mental images of objects, patterns, and paths.
	When **applying with understanding** learners: • use whole numbers up to thousands or beyond in real-life situations • use fast recall of multiplication anddivision number facts in real-life situations use decimal fractions in real-life situations • use mental and written strategies for multiplication and division in real-life situations • select an efficient method for solving a problem, for example,	When **applying with understanding** learners: • select appropriate methods for representing patterns, for example using words, symbols and tables • use number patterns to make predictions and solve problems • use the properties and relationships of the four operations to solve problems.	When **applying with understanding** learners: • use standard units of measurement to solve problems in real-life situations involving perimeter, area and volume • select appropriate tools and units of measurement • use timelines in units of inquiry and other real-life situations.	When **applying with understanding** learners: • design a survey and systematically collect, organize and display data in pictographs and bar graphs • select appropriate graph form(s) to display data • interpret range and scale on graphs • use probability to determine mathematically fair and unfair games and to explain possible	When **applying with understanding** learners: • analyse and describe 2D and 3D shapes, including regular and irregular polygons, using geometrical vocabulary • identify, describe and model congruency and similarity in 2D shapes • recognize and explain symmetrical patterns, including tessellation, in the environment • apply knowledge of transformations

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	mental estimation, mental or written strategies, or by using a calculator • use strategies to evaluate the reasonableness of answers • add and subtract fractions with related denominators in real-life situations • add and subtract decimals in real-life situations, including money • estimate sum, difference, product and quotient in real-life situations, including fractions and decimals.			outcomes • express probability using simple fractions.	to problem-solving situations.

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