CIPS Math scope and sequence March 2014

Year 6 (10-11s)					
	Number	**Pattern & Function**	**Measurement**	**Data Handling**	**Space and Shape**
Overall expectations	Learners will understand that the base 10 place value system extends infinitely in two directions and will be able to model, compare, read, write and order numbers to millions or beyond, as well as model integers. They will develop an understanding of ratios. They will understand that fractions, decimals and percentages are ways of representing whole-part relationships and will work towards modelling, comparing, reading, writing, ordering and converting fractions, decimals and percentages. They will use mental and written strategies to solve problems involving whole numbers, fractions and decimals in real-life situations, using a range of strategies to evaluate reasonableness of answers.	Learners will understand that patterns can be represented, analysed and generalized using algebraic expressions, equations or functions. They will use words, tables, graphs and, where possible, symbolic rules to analyse and represent patterns. They will develop an understanding of exponential notation as a way to express repeated products, and of the inverse relationship that exists between exponents and roots. The students will continue to use their understanding of pattern and function to represent and make sense of real-life situations and to solve problems involving the four operations.	Learners will understand that a range of procedures exists to measure different attributes of objects and events, for example, the use of formulas for finding area, perimeter and volume. They will be able to decide on the level of accuracy required for measuring and using decimal and fraction notation when precise measurements are necessary. To demonstrate their understanding of angles as a measure of rotation, the learners will be able to measure and construct angles.	Learners will collect, organize and display data for the purposes of valid interpretation and communication. They will be able to use the mode, median, mean and range to summarize a set of data. They will create and manipulate an electronic database for their own purposes, including setting up spreadsheets and using simple formulas to create graphs. Learners will understand that probability can be expressed on a scale (0–1 or 0%–100%) and that the probability of an event can be predicted theoretically.	Learners will understand the properties of regular and irregular polyhedra. They will understand the properties of 2D shapes and understand that 2D representations of 3D objects can be used to visualize and solve problems in the real world, for example, through the use of drawing and modelling. Learners will develop their understanding of the use of scale (ratio) to enlarge and reduce shapes. They will apply the language and notation of bearing to describe direction and position.
Conceptual understandings	The base 10 place value system extends infinitely in two directions. Fractions, decimal fractions and percentages are ways of representing whole-part relationships. For fractional and decimal computation, the ideas developed for whole-number computation can apply. Ratios are a comparison of two numbers or quantities.	Patterns can often be generalized using algebraic expressions, equations or functions. Exponential notation is a powerful way to express repeated products of the same number.	Accuracy of measurements depends on the situation and the precision of the tool. Conversion of units and measurements allows us to make sense of the world we live in. A range of procedures exists to measure different attributes of objects and events.	Data can be presented effectively for valid interpretation and communication. Range, mode, median and mean can be used to analyse statistical data. Probability can be represented on a scale between 0–1 or 0%–100%. The probability of an event can be predicted theoretically.	Manipulation of shape and space takes place for a particular purpose. Consolidating what we know of geometric concepts allows us to make sense of and interact with our world. Geometric tools and methods can be used to solve problems relating to shape and space.

Expectations in red are for the current year group

Expectations in black are the rest of the expectations in the phase. They are included so teachers can see what 'next steps' will be

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Learner Outcomes	When **constructing meaning** learners: • model numbers to millions or beyond using the base 10 place value system • model ratios • model integers in appropriate contexts • model exponents and square roots • model improper fractions and mixed numbers • simplify fractions using manipulatives • model decimal fractions to thousandths or beyond • model percentages • understand the relationship between fractions, decimals and percentages • model addition, subtraction, multiplication and division of fractions • model addition, subtraction, multiplication and division of decimals.	When **constructing meaning** learners: • understand that patterns can be generalized by a rule • understand exponents as repeated multiplication • understand the inverse relationship between exponents and roots • understand that patterns can be represented, analysed and generalized using tables, graphs, words, and, when possible, symbolic rules.	When **constructing meaning** learners: • understand procedures for finding area, perimeter and volume • understand the relationships between area and perimeter, between area and volume, and between volume and capacity • understand unit conversions within measurement systems . (metric)	When **constructing meaning** learners: • understand that different types of graphs have special purposes • understand that the mode, median, mean and range can summarize a set of data • understand that probability can be expressed in scale (0–1) or per cent (0%–100%) • understand the difference between experimental and theoretical probability.	When **constructing meaning** learners: • understand the common language used to describe shapes • understand the properties of regular and irregular polyhedra • understand the properties of circles • understand how scale (ratios) is used to enlarge and reduce shapes • understand systems for describing position and direction • understand that 2D representations of 3D objects can be used to visualize and solve problems • understand that geometric ideas and relationships can be used to solve problems in other areas of mathematics and in real life.
	When **transferring meaning into symbols** learners: • read, write, compare and order whole numbers up to millions or beyond • read and write ratios • read and write integers in appropriate contexts • read and write exponents and square roots • convert improper fractions to mixed numbers and vice versa • simplify fractions in mental and written form • read, write, compare and order	When **transferring meaning into symbols** learners: • represent the rule of a pattern by using a function • analyse pattern and function usingwords, tables and graphs, and, when possible, symbolic rules.	When **transferring meaning into symbols** learners: • develop and describe formulas for finding perimeter, area and volume • use decimal and fraction notation in measurement, for example, 3.2 cm, 1.47 kg, 1½ miles • read and interpret scales on a range of measuring instruments • measure and construct angles in degrees using a protractor • carry out simple unit conversions within a system of	When **transferring meaning into symbols** learners: • collect, display and interpret data in circle graphs (pie charts) and line graphs • identify, describe and explain the range, mode, median and mean in a set of data • set up a spreadsheet using simple formulas to manipulate data and to create graphs • express probabilities using scale (0–1) or per cent (0%–100%).	When **transferring meaning into symbols** learners: • analyse, describe, classify and visualize 2D (including circles, triangles and quadrilaterals) and 3D shapes, using geometric vocabulary • describe lines and angles using geometric vocabulary • identify and use scale (ratios) to enlarge and reduce shapes • identify and use the language and notation of bearing to describe direction and position • create and model how a 2D net converts into a 3D shape and vice

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	decimal fractions to thousandths or beyond • read, write, compare and order percentages • convert between fractions, decimals and percentages.		measurement (metric).		versa • explore the use of geometric ideas and relationships to solve problems in other areas of mathematics.
	When **applying with understanding** learners: • use whole numbers up to millions or beyond in real-life situations • use ratios in real-life situations • use integers in real-life situations • convert improper fractions to mixed numbers and vice versa in real-life situations • simplify fractions in computation answers • use fractions, decimals and percentages interchangeably in real llife situations • select and use an appropriate sequence of operations to solve word problems • select an efficient method for solving a problem: mental estimation, mental computation, written algorithms, by using a calculator • use strategies to evaluate the reasonableness of answers • use mental and written strategies for adding, subtracting, multiplying and dividing fractions and decimals in real-life situations • estimate and make approximations in real-life situations involving fractions, decimals and percentages.	When **applying with understanding** learners: analyse patterns and identify rules • use functions to solve problems • select appropriate methods to .	When **applying with understanding** learners: • select and use appropriate units of measurement and tools to solve problems in real-life situations • determine and justify the level of accuracy required to solve real-life problems involving measurement • use decimal and fractional notation in measurement, for example, 3.2 cm, 1.47 kg • use timetables and schedules (12- hour and 24-hour clocks) in real-life situations • determine times worldwide.	When **applying with understanding** learners: • design a survey and systematically collect, record, organize and display the data in a bar graph, circle graph, line graph • identify, describe and explain the range, mode, median and mean in a set of data • create and manipulate an electronic database for their own purposes • determine the theoretical probability of an event and explain why it might differ from experimental probability.	When **applying with understanding** learners: • use geometric vocabulary when describing shape and space in mathematical situations and beyond • use scale (ratios) to enlarge and reduce shapes • apply the language and notation of bearing to describe direction and position • use 2D representations of 3D objects to visualize and solve problems, for example using drawings or models

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