Primary Mathematics Curriculum

Sets and operations

Children should be given opportunities to demonstrate how the knowledge and skills gained in this strand can be used to link, reinforce and progress learning across the other four interconnected strands.

	a The learner	b The learner	c The learner	d The learner	e The learner	f The learner	g The learner	h The learner	i The learner	j The learner	k The learner
Elements	**Sets and operations**										
Understanding and Connecting	Combines and partitions various quantities (using concrete materials). Increases and decreases various quantities.	Chooses attributes for sorting materials. Sorts and re-sorts a variety of materials (For example: structured materials, such as blocks and unstructured materials, such as shells) into sets according to a single attribute [property] each time. Subitises [look at a group of objects and realise how many there are, without counting] number of objects in a set. Matches objects and/or sets using one-to-one correspondence [assigning numbers to objects in correct order].	Sorts items into sets by quantity. Matches numerals to sets up to at least 10. Combines sets of objects to make at least 10. Partitions sets of 2 or more objects.	Recognises the zero property of an empty set. Combines sets of objects up to at least 10 including the empty set/zero. Partitions sets of objects [2 to at least 10] into two or more subsets. References odd and even numbers in this context. Uses knowledge of addition to develop understanding of subtraction (For example: 2+4=6 so 6-4=2).	Combines and partitions sets of objects up to at least 20. Explores and uses the zero property when performing calculations. Adds within 100, including 2-digit + 1-digit and 2-digit + 2-digit. Subtracts numbers within 99, with and without renaming.	Explores addition and subtraction up to at least 199. Practices repeated addition and group or skip counting. Uses inverse operations to check addition and subtraction calculations. Subtracts numbers up to at least 199, with and without renaming. Compares equivalent and non-equivalent sets.	Adds and subtracts within 999, with and without renaming. Visualises models of multiplication, including repeated addition, scaling and rectangular arrays. Visualises models of division as equal sharing/repeated subtraction and repeated addition and vice versa. Divides 2-digit numbers by a 1-digit number, with and without remainders. Multiplies a 1-digit or 2-digit number by 0–10. Explores the implications of multiplying by 10. Uses knowledge of multiplication number facts to develop knowledge of division number facts.	Adds and subtracts within 9999, with and without renaming. Divides 3-digit numbers by a 1-digit number, without and with remainders. Multiplies a 2-digit or 3-digit number by a 1 or 2-digit number. Adds and subtracts whole numbers and decimals up to two places. Multiplies and divides a decimal number up to two places by a single digit whole number. Performs simple calculations involving integers [numbers crossing zero].	Adds and subtracts whole numbers and decimals [to 3 decimal places], without and with a calculator and checks reasonableness of answers. Multiplies a decimal [up to 3 places] by a whole number, without and with a calculator and checks reasonableness of answers. Divides a 3-digit number by a 2-digit number, with a calculator and checks reasonableness of answer. Multiplies a decimal by a decimal, with a calculator and checks reasonableness of answer. Multiplies and divides a whole number by 100. Identifies prime and composite numbers up to 100.	Multiplies a decimal by a decimal, with and without a calculator and checks reasonableness of answers. Divides a 4-digit number by a 2-digit number with or without a calculator and checks reasonableness of answers. Identifies prime and composite numbers beyond 100. Explores the order of operations using brackets and exponents.	Divides a decimal number by a decimal, without a calculator and checks reasonableness of answers. Extends previous conceptual and practical work to include larger numbers and further decimals. Uses concrete and dot representation to express prime and composite numbers.

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Communicating	Engages with activities that encourage comparisons of quantities in sets.	Describes the process of sorting and justifies selection criteria used in forming sets. Represents a verbal context or task using concrete objects. Uses appropriate gestures and words to convey and make comparisons.	Uses comparative language, [more, less, same/equal] to compare sets to at least 10. Records a number sentence pictorially. Jumps forwards on a number line or path to begin to express addition.	Counts forwards and backwards in ones to demonstrate addition [how many more] and subtraction [how many less]. Jumps forwards /backwards on a number line or path/strip to begin to express addition and subtraction.	Fluently recalls addition and subtraction facts [bonds] to at least 10. Uses symbols +, -, = to convey addition and subtraction facts. Records equivalent and non-equivalent sets 0-20 using <, > and =.	Fluently recalls addition and subtraction facts [bonds] to at least 20. Uses symbols +, -, =, < and > to convey addition and subtraction facts. Describes and records mental strategies for addition within 99. Records equivalent and non-equivalent sets up to 99 using <,> and =.	Fluently recalls addition and subtraction facts [bonds] beyond 20. Practices multiplication and division facts based on number families [10,5/2,4,8/3,6,9/7].	Recalls more complex multiplication facts based on known facts (For example: multiplication facts based on number families (10,5/2,4,8/3,6,9/7).	Fluently recalls multiplication and division facts. Illustrates prime and composite numbers on a hundred square. Explains the properties governing prime and composite numbers.	Generates multiples and factors using a variety of tools and strategies. Identifies prime and composite numbers with increasing fluency.	Establishes common factors and common multiples using the prime factorisation of numbers.

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Reasoning	Differentiates between sets based on their quantity.	Justifies classification of objects into sets. Combines and partitions sets of objects. Identifies, recognises and estimates 'more' or 'less' in the real-life context and/ or play.	Accurately counts and compares equivalent and non-equivalent sets from 1 up to at least 5 and establishes which set has more or less.	Partitions sets 2-10 into two or more subsets and recognises that this does not affect the total (For example: 1+2+6=9). Demonstrates understanding of all possible partitions of number bonds up to at least 10. Compares equivalent and non-equivalent sets by value [1 to at least 10] and establishes how much more/less.	Justifies and explains the commutative property in relation to addition facts (For example: 3+4=4+3). Estimates totals and differences within 99. Uses number sense to identify unreasonable and reasonable answers. Justifies the selection and use of operations [addition and subtraction] in a variety of contexts.	Uses a range of estimation strategies (For example - clustering, front-end estimation) routinely to check the reasonableness of a solution. Applies and justifies the associative and zero properties to support calculations. Develops strategies for efficient computation of addition and subtraction number facts.	Uses inverse operations to explain and check answers. Explores alternative solution strategies to addition and subtraction tasks. Justifies the efficiency of one estimation strategy over another for specific numbers or contexts. Justifies the selection and use of operations [addition, subtraction, multiplication and division] in a variety of contexts.	Analyses the links between addition and multiplication, and division and subtraction. Recognises when and how to use a calculator, and checks reasonableness of answers. Uses inverse operations to check multiplication and division calculations (For example: 6x4=24, 24÷4=6). Develops strategies for efficient computation of multiplication and division number facts.	Estimates using a variety of strategies, sums, differences, products and quotients of whole numbers. Recognises, explains and uses the connections between multiplication and division to complete mental and written calculations. Identifies factors and multiples from basic multiplication facts. Deduces or conjectures that all prime numbers, except 2, are odd numbers. Explores lowest common multiple [LCM] in terms of fractional equivalence.	Extends understanding of factors and multiples in N [Natural numbers] by exploring the highest common factor [HCF] and the lowest common multiple [LCM]. Estimates sums, differences, products and quotients of decimals. Evaluates expressions that contain brackets and exponents, using order of operations. Identifies the common factors and multiples of whole numbers within 100.	Evaluates expressions that involve integers, including expressions that contain brackets and exponents.

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Applying and Problem-Solving	Demonstrates an awareness of objects being introduced to or taken away from a set.	Plays games and participates in singing, actions, games and rhymes where objects are added or taken away.	Uses appropriate strategies to find out how many. Orders sets of objects according to their quantity, up to at least 5.	Uses a range of strategies to add and subtract mentally to at least 10. Orders sets of objects up to at least 10.	Selects and shares mental strategies for addition and subtraction facts within 20. Constructs number sentences and number stories to solve problems involving addition and subtraction within 99. Solve tasks involving missing addends (For example: 3 + ___ = 5 and 3 + 2 + 1 = 4 + ___).	Constructs number sentences and number stories to solve problems involving addition and subtraction within 199. Solves multi-step problems involving addition and subtraction [using real-life contexts where appropriate].	Solves problems involving multiplication and division [using real-life contexts where appropriate]. Applies a range of strategies, including visual strategies, to solve problems involving more than one operation.	Explores and applies the zero, commutative, distributive and associative properties of multiplication. Solves and completes practical tasks and problems involving multiplication of whole numbers. Solves problems involving decimals [using real-life contexts where appropriate].	Uses a variety of strategies to solve addition, subtraction, multiplication and division problems involving decimal and whole numbers. Compares and discusses proposed solutions to problems/tasks.	Solves multi-step problems contexts and involving whole numbers and decimals using a variety of tools and strategies [using real-life contexts where appropriate]. Uses estimation when solving problems involving operations with whole numbers, decimals and percentages, to help judge reasonableness of a solution.	Solves problems involving percentages expressed to one decimal place (For example: 10.3%, 12.7%) and whole-number percentages greater than 100 [using real-life contexts where appropriate]. Uses estimation when solving problems involving operations with whole numbers, decimals, percentages, integers, and fractions to help judge the reasonableness of a solution.