Rose Hill Maths Journey: Place Value

Rose Hill Primary School

EYFS

- Verbally count beyond 20, recognising the pattern of the counting system.
- Link the number symbol (numeral) with its cardinal number value.
- Subitise (recognising quantities without counting) up to 5
- Have a deep understanding of numbers to 10, including the composition of each number
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.

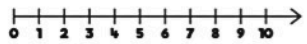
YEAR 1

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- given a number, identify one more and one less
- read and write numbers from 1 to 20 in numerals and words
- identify and represent numbers using objects and pictorial representations including the number line
- use the language of: equal to, more than, less than (fewer), most, least

YEAR 2

- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward
- read and write numbers to at least 100 in numerals and in words
- identify, represent and estimate numbers using different representations, including the number line
- recognise the place value of each digit in a two-digit number (tens, ones)
- compare and order numbers from 0 up to 100; use <, > and = signs

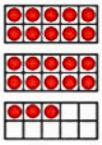
+ problem solving

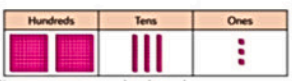


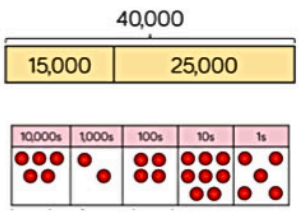
YEAR 3

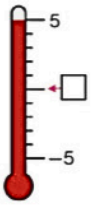
- count from 0 in multiples of 4, 8, 50 and 100
- find 10 or 100 more or less than a given number
- read and write numbers up to 1000 in numerals and in words
- identify, represent and estimate numbers using different representations
- recognise the place value of each digit in a three- digit number (hundreds, tens, ones)
- compare and order numbers up to 1000

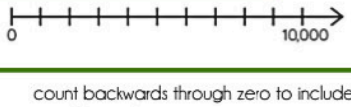
+ problem solving

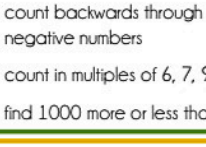






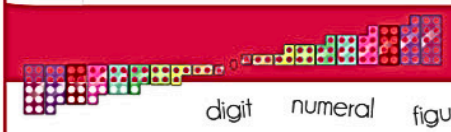






- count backwards through zero to include negative numbers
- count in multiples of 6, 7, 9, 25 and 1000
- find 1000 more or less than a given number
- read Roman numerals to 100 (I to C)
- identify, represent and estimate numbers using different representations
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- round any number to the nearest 10, 100 or 1000

+ problem solving



Key

- Counting
- Reading & Writing Numbers
- Identifying, Representing & Estimating Numbers
- Understanding Place Value
- Comparing Numbers
- Rounding

VOCABULARY

digit, numeral, figure, partition, round, compare, estimate, negative, integer, value, equal, less than, greater than, zero, ones, tens, hundreds, thousands, millions

YEAR 5

- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- read and write numbers to at least 1,000,000
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals.
- determine the value of each digit in numbers to at least 1,000,000
- order and compare numbers to at least 1,000,000
- round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000

YEAR 6

- use negative numbers in context, and calculate intervals across zero
- read and write numbers up to 10,000,000
- determine the value of each digit in numbers up to 10,000,000
- order and compare numbers up to 10,000,000
- round any whole number to a required degree of accuracy

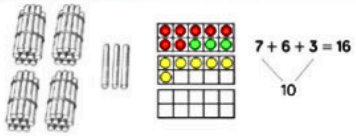
+ problem solving

Rose Hill Maths Journey: + and -

Rose Hill Primary School

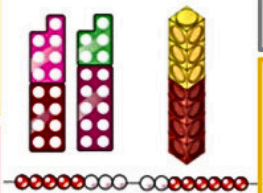
EYFS

- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts



YEAR 1

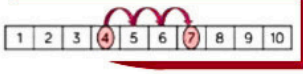
- represent and use number bonds and related subtraction facts within 20
- add and subtract one- digit and two-digit numbers to 20, including zero
- read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7= ■ - 9



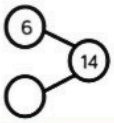
Y1: Use of manipulatives

- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot

Y2: Use of manipulatives, ten frames

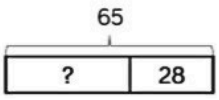


Y1: Number track



Y1: Part whole model

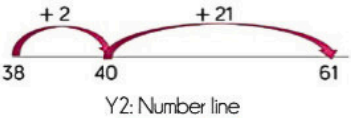
YEAR 2



Y2: Bar model

- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

solve problems with addition and subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods



Y2: Number line

add and subtract numbers mentally, including:
- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds

Key

Number Bonds

Mental Calculation

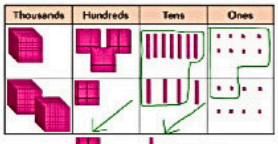
Written Methods

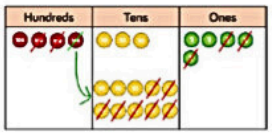
Inverse Operations, Estimating and Checking Answers

Problem Solving

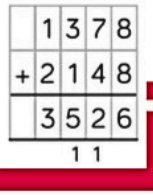
YEAR 3

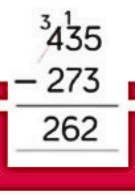
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction





Y3/4: Use of place value counters or base 10.

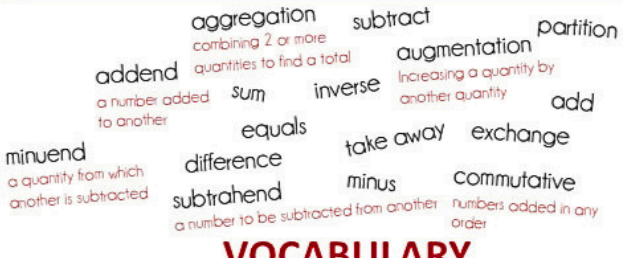




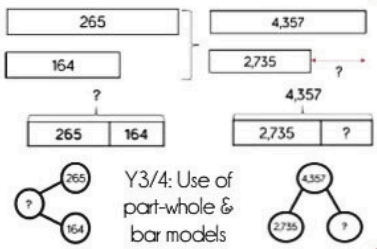
Y3/4: Column addition & subtraction

- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

YEAR 4



VOCABULARY



Y3/4: Use of part-whole & bar models

YEAR 6

- perform mental calculations, including with mixed operations and large numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division

YEAR 5

- add and subtract numbers mentally with increasingly large numbers
- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- add and subtract decimals
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Rose Hill Maths Journey: x and ÷

Rose Hill Primary School

EYFS

- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed evenly

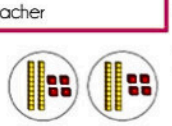
YEAR 1

- count in multiples of twos, fives and tens
- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

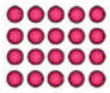
- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

divide, multiply, scaling, inverse, commutative (numbers can be multiplied in any order), factor



Use of manipulatives to group & share



Arrays

Repeated addition & subtraction

YEAR 2

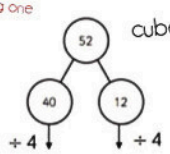
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs

- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

divisor (in division, the number by which another is divided), multiple, prime, quotient (the result of a division), product (the result of multiplying one number by another), partition, square ^{2}, cube ^{3}, dividend (in division, the number that is divided), array, exchange

VOCABULARY

- count from 0 in multiples of 4, 8, 50 and 100
- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables



Use of a part whole model for division

Key

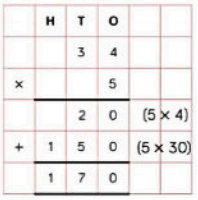
- Multiplication & Division Facts
- Mental Calculation
- Written Methods
- Properties of Numbers
- Inverse Operations, Estimating and Checking Answers
- Problem Solving

- count in multiples of 6, 7, 9, 25 and 1000
- recall multiplication and division facts for multiplication tables up to 12 × 12

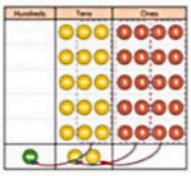
YEAR 3

- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one- digit numbers, using mental and progressing to formal written methods
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems

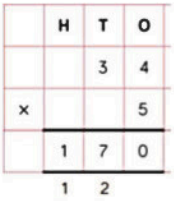
- use place value, known and derived facts to multiply and divide mentally, including:
  - multiplying by 0 and 1
  - dividing by 1
  - multiplying together three numbers
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout (short multiplication)
- recognise and use factor pairs and commutativity in mental calculations
- estimate and use inverse operations to check answers to a calculation
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems



Expanded method



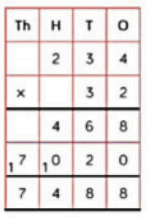
Use of place value counters



Short multiplication

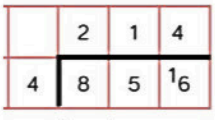
YEAR 4

- perform mental calculations, including with mixed operations and large numbers
- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division
- identify common factors, common multiples and prime numbers
- use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve problems involving addition, subtraction, multiplication and division

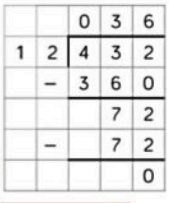


Long multiplication

Use of place value counters



Short division



12 × 1 = 12
12 × 2 = 24
12 × 3 = 36
12 × 4 = 48
12 × 5 = 60
12 × 6 = 72
12 × 7 = 84
12 × 8 = 96
12 × 7 = 108
12 × 10 = 120

Long division

YEAR 6

YEAR 5

- multiply and divide numbers mentally drawing upon known facts
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division
- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
- know and use the vocabulary of prime numbers, prime factors and composite numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- recognise and use square numbers and cube numbers
- solve problems involving all of the above and including scaling by simple fractions

Rose Hill Maths Journey: Fractions and Decimals

Rose Hill Primary School

EYFS

- Verbally count beyond 20, recognising the pattern of the counting system

Key

Fractions

Decimals

Equivalence

Calculating with Fractions

Calculating with Decimals

YEAR 1

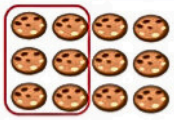
- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

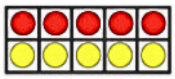
VOCABULARY

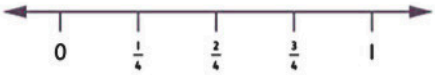
half, quarter, third, equivalent, decimal, equal, unit fraction, numerator, percentage, denominator, non-unit fraction, thousandth, mixed number, improper fraction, tenth, hundredth, decimal place

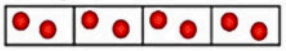
- recognise, find, name and write fractions 1/3, ¼, 2/4 and ¾ of a length, shape, set of objects or quantity.
- write simple fractions e.g. ½ of 6 = 3 and recognise the equivalence of 2/4 and 1/2

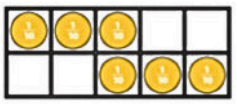
YEAR 2

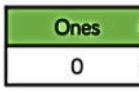


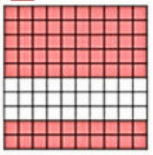








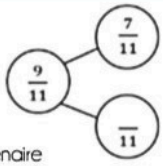




- count up and down in tenths
- recognise, find and write fractions of a discrete set of objects
- recognise that tenths arise from dividing an object into 10 equal parts and in dividing 1 digit numbers or quantities by 10.
- recognise and use fractions as numbers
- compare and order unit fractions, and fractions with the same denominators

- count up and down in hundredths
- recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten

YEAR 3



$\frac{2}{7}+\frac{2}{7}=$

- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole

+ problem solving

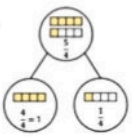
- compare numbers with the same number of decimal places up to two decimal places
- round decimals with one decimal place to the nearest whole number

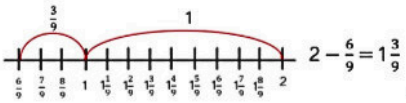
- recognise and show, using diagrams, families of common equivalent fractions
- recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to ½, ¼, ¾

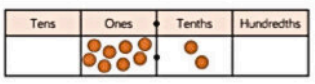
YEAR 4

- add and subtract fractions with the same denominator
- find the effect of dividing a one- or two-digit number by 10 and 100

+ problem solving







$0.3=\frac{3}{10}=\frac{30}{100}$

- compare and order fractions, including fractions >1
- identify the value of each digit in numbers given to three decimal places
- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- associate a fraction with division and calculate decimal fraction equivalents
- recall and use equivalences between simple fractions, decimals and percentages
- add and subtract fractions with different denominators and mixed numbers
- multiply simple pairs of proper fractions
- divide proper fractions by whole numbers
- multiply decimals by whole numbers
- multiply and divide numbers by 10, 100 and 1000

+ problem solving

YEAR 6

YEAR 5

- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- compare and order fractions whose denominators are all multiples of the same number
- read, write, order and compare numbers with up to three decimal places
- round decimals with two decimal places to the nearest whole number and to one decimal place
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- read and write decimal numbers as fractions
- recognise mixed numbers and improper fractions and convert from one form to the other
- recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with 100 as the denominator
- add and subtract fractions with the same denominator and multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams