Addition and subtraction

Year 4	Year 5
Mental calculation	
	add and subtract numbers mentally with increasingly large numbers
Written methods	
add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
Inverse operations, checking and estimating answers	
estimate and use inverse operations to check answers to a calculation	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
Problem solving	
solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Algebra

Year 4	Year 5
Equations	
	use the properties of rectangles to deduce related facts and find ***missing lengths and angles*** (copied from Geometry: Properties of Shapes)
Formula	
Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit. (Copied from NSG measurement)	

Fractions (including decimals and percentages)

Year 4	Year 5
Counting in fractional steps	
count up and down in hundredths	
Recognising fractions	
recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents (appears also in Equivalence)
Comparing fractions	
	compare and order fractions whose denominators are all multiples of the same number
Comparing decimals	
compare numbers with the same number of decimal places up to two decimal places	read, write, order and compare numbers with up to three decimal places
Rounding including decimals	
round decimals with one decimal place to the nearest whole number	round decimals with two decimal places to the nearest whole number and to one decimal place
Equivalence (including fractions, decimals and percentages)	
recognise and show, using diagrams, families of common equivalent fractions	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
recognise and write decimal equivalents of any number of tenths or hundredths	read and write decimal numbers as fractions (e.g. 0.71 = $^{71}/_{100}$)
	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
recognise and write decimal equivalents to $^{1}/_{4}$; $^{1}/_{2}$; $^{3}/_{4}$	recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator 100 as a decimal fraction
Addition and subtraction of fractions	
add and subtract fractions with the same denominator	add and subtract fractions with the same denominator and multiples of the same number
	recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $^{2}/_{5} + ^{4}/_{5} = ^{6}/_{5} = 1^{1}/_{5}$)
Multiplication and division of fractions	
	multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
Multiplication and division of decimals	
find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths	
Problem solving	
solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit	solve problems involving numbers up to three decimal places

fractions where the answer is a whole number	
solve simple measure and money problems involving fractions and decimals to two decimal places.	solve problems which require knowing percentage and decimal equivalents of $^{1}/_{2}$, $^{1}/_{4}$, $^{1}/_{5}$, $^{2}/_{5}$, $^{4}/_{5}$ and those with a denominator of a multiple of 10 or 25.

Geometry: position and direction

Year 4	Year 5
Position, direction and movement	
describe positions on a 2-D grid as coordinates in the first quadrant	identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed
describe movements between positions as translations of a given unit to the left/right and up/down	
plot specified points and draw sides to complete a given polygon	

Geometry: properties of shapes

Year 4	Year 5
Identifying shapes and their properties	
identify lines of symmetry in 2-D shapes presented in different orientations	identify 3-D shapes, including cubes and other cuboids, from 2-D representations
Drawing and constructing	
complete a simple symmetric figure with respect to a specific line of symmetry	draw given angles, and measure them in degrees (^{o})
Comparing and classifying	
compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	use the properties of rectangles to deduce related facts and find missing lengths and angles
	distinguish between regular and irregular polygons based on reasoning about equal sides and angles
Angles	
	know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
identify acute and obtuse angles and compare and order angles up to two right angles by size	identify: * angles at a point and one whole turn (total 360°) * angles at a point on a straight line and ½ a turn (total 180°) * other multiples of 90°

Measurement

Year 4	Year 5
Comparing and estimating	
estimate, compare and calculate different measures, including money in pounds and pence (also included in Measuring)	calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes (also included in measuring)
	estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water)
Measuring and calculating	
estimate, compare and calculate **different measures,** including **money in pounds and pence** (appears also in Comparing)	use all four operations to solve problems involving measure (e.g. **length, mass, volume, money**) using decimal notation including scaling.
measure and calculate the **perimeter** of a rectilinear figure (including squares) in centimetres and metres	measure and calculate the **perimeter** of composite rectilinear shapes in centimetres and metres
find the area of rectilinear shapes by counting squares	calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes *recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})* (copied from Multiplication and Division)
Telling the time	
read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting)	
solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Converting)	solve problems involving converting between units of time
Converting	
convert between different units of measure (e.g. kilometre to metre; hour to minute)	convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting)	solve problems involving converting between units of time
solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Telling the Time)	understand and use equivalences between metric units and common imperial units such as inches, pounds and pints

Multiplication and division

Year 4	Year 5
Multiplication and division facts	
count in multiples of 6, 7, 9, 25 and 1 000 (copied from Number and Place Value)	*count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000* (copied from Number and Place Value)
recall multiplication and division facts for multiplication tables up to 12 × 12	
Mental calculation	
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 and divide numbers mentally drawing upon known facts
recognise and use factor pairs and commutativity in mental calculations (appears also in Properties of Numbers)	multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
Written calculation	
multiply two-digit and three-digit numbers by a one-digit number using formal written layout	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 and interpret remainders appropriately for the context
Properties of numbers: multiples, factors, primes, square and cube numbers	
recognise and use factor pairs and commutativity in mental calculations (repeated)	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 (non-prime) 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, and the notation for squared (^{2}) and cubed (^{3})
Inverse operations, estimating and checking answers	
estimate and use inverse operations to check answers to a calculation (copied from Addition and Subtraction)	
Problem solving	
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 such as n objects are connected to m objects	solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
	solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
	solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Place value

Year 4	Year 5
Counting	
count backwards through zero to include negative numbers	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
count in multiples of 6, 7, 9, 25 and 1000	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
find 1000 more or less than a given number	
Comparing numbers	
order and compare numbers beyond 1000	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)
compare numbers with the same number of decimal places up to two decimal places (copied from Fractions)	
Identifying, estimating and representing numbers	
identify, represent and estimate numbers using different representations	
Reading and writing numbers	
read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Comparing Numbers)
	read Roman numerals to 1000 (M) and recognise years written in Roman numerals.
Understanding place value	
recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)
find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths (copied from Fractions)	*recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents* (copied from Fractions)
Rounding	
round any number to the nearest 10, 100 or 1 000	round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000
round decimals with one decimal place to the nearest whole number (copied from Fractions)	*round decimals with two decimal places to the nearest whole number and to one decimal place* (copied from Fractions)
Problem solving	
solve number and practical problems that involve all of the above and with increasingly large positive numbers	solve number problems and practical problems that involve all of the above

Statistics

Year 4	Year 5
Interpreting, constructing and presenting data	
interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	complete, read and interpret information in tables, including timetables
Solving problems	
solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	solve comparison, sum and difference problems using information presented in a line graph