St Winifred's Catholic Primary School

Maths Curriculum Map

'*Pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems'* (Mathematics programmes of study: key stages 1 and 2, p3).

Reflecting the aims of the National Curriculum, the St Winifred's curriculum map consists of three parts:

- Progression maps organised according to year group coverage and key maths topics (NCETM).
- An overview of multiplication and division facts progression across Key Stages 1 and 2.
- Teaching sequences for each year group produced by White Rose Maths.

Other sources- links to Maths Mastery:

- Teachers should refer to the NCETM's professional development materials to assist their professional development and enable them to deliver teaching for mastery with confidence https://www.ncetm.org.uk/resources/50639.
- Integral to mastery of the curriculum is the development of deep rather than superficial conceptual understanding. Therefore teachers can also refer to the NCETM's reasoning resources and 'Teaching for Mastery' materials for examples and activities to deepen children's conceptual understanding https://www.ncetm.org.uk/resources/46689.
- In June 2020, the Department for Education published Mathematics guidance: Keys Stage 1 and 2 to support teachers' long-term, medium-term and short-term planning, and assessment. The ready-to-progress tables at the start of each year group and the 'Making connections' features demonstrate how to make connections between mathematical ideas and develop understanding based on logical progression. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/897806/Maths_guidance_KS_1_and_2.pdf

Essential Learning in Mathematics

Summary of Essential Learning in Year 1
• Count to and across 100; count in 2s, 5s, 10s from zero; read and write numbers to 100 in numerals
• Count out, quantify, compare sizes of sets of objects; order and describe comparative size of numbers to 20; use ordinal numbers
• Understand and apply the operations of addition and subtraction and the operations of division and multiplication as equal sharing, repeated equal grouping; find halves and quarters
• Represent, memorise and use addition facts to 9 + 9 and derive related subtraction facts; identify 1 and 10 more/less
• Take and compare measurements using common standard units; use language of and tell time to hour and half hour; recognise and use coins
• Recognise, describe and name common 2-D and 3-D shapes; use the language of position, direction and movement; make whole, half and quarter turns

Problem Solving, Reasoning, Communicating

- Pupils solve problems in practical contexts that involve counting, ordering, sequencing and combining whole numbers. They add and subtract quantities interpreting and using mathematical language to develop an understanding of the concepts involved when carrying out the operations. Pupils compare objects and sort them by their length, weight and capacity to find the biggest or smallest item. They begin to take measurements and record the results. Pupils use coins and notes to solve problems involving money, and describe and sequences events in time.
- Pupils begin to give reasons for their decisions and choices. They explain why one set of objects has fewer or more objects than another. They justify their comparisons when they order groups of objects against a given property or by taking measurements. Pupils recognise when and why shapes are the same even though they are not the same size or are placed in different orientations, and can say why this is the case.
- Pupils read and record numbers to 100 and talk about halves and quarters of objects and quantities. They describe repeating patterns and arrays and talk about events in time. They construct familiar mathematical shapes and names these when comparing and describing shapes with similar everyday objects. Pupils give instructions to move objects and use simple language of direction, distance and position, including half and quarter turns about a point.

Language and Mathematics

The ***National Curriculum*** (Section 6: September 2013 Reference DFE-00180-2013) declares that:
"Teachers should develop pupils' spoken language, reading, writing and vocabulary as integral aspects of the teaching of every subject. Pupils should be taught to speak clearly and convey ideas confidently ... They should learn to justify ideas with reasons; ask questions to check understanding; develop vocabulary and build knowledge; negotiate; evaluate and build on the ideas of others ...They should be taught to give well-structured descriptions and explanations and develop their understanding through speculating, hypothesising and exploring ideas. This will enable them to clarify their thinking as well as organise their ideas ... Teachers should develop pupils' reading and writing in all subjects to support their acquisition of knowledge ... with accurate spelling and punctuation."

When we think mathematically we may use pictures, diagrams, symbols and words. We communicate our ideas, reasons, solutions and strategies to others using the spoken and written word. We listen to how others explain their methods using mathematical language and read what they have written so we can interpret their ideas and solutions. Language is a fundamental tool of learning and this is as true for learning mathematics as it is for any other subject. Having a good command of the spoken language of mathematics is an essential part of learning, and for developing confidence in mathematics. Children who say little are usually those who are fearful about saying the wrong thing, or giving an incorrect answer. Very often the quiet children are those who may lack knowledge of, or confidence in using the necessary vocabulary to express their ideas and thoughts to themselves and consequently to others. Mathematics has its own vocabulary which children need to acquire and use. They need to be taught how to pronounce, write and spell the mathematical words they are to use, and to know when they apply and to what they apply. Learning the vocabulary and language of mathematics involves:

- associating objects, shapes and events with their names (e.g. the number is 30; this shape is a circle; the clock says three o'clock)
- stating, repeating and recalling facts aloud, and explaining how they can be used and applied (e.g. one more than sixteen is seventeen; this is the fifth cube in the row, this is the sixth so the next cube is the seventh cube; 5 add 5 is 10 so 5 add 6 is one more and is 11)
- describing the relationship between two or more items, shapes, events or sets (e.g. this is half of the shape and this is a quarter and it is smaller; today is Wednesday so tomorrow is Thursday; there are nine blocks in this set and eleven blocks in this set so the first set has fewer blocks)
- identifying properties and describing them (e.g. this triangle has corners, but circles have no corners; this coin is a 10 pence and is worth more than this 2 pence coin; all these numbers are smaller than 18 as they come before 18 on my number track)
- framing an explanation, reasoning and making deductions (e.g. because my pattern has 4 squares - red, blue, red, yellow squares - the next is a red square; these are not halves they are not equal; when I count in fives, 35 is in as it ends in a five; if I put my two triangles together I can make a rectangle)

Learning the Language of Mathematics

Learning to use the language of mathematics requires carefully prepared opportunities and continued experience and practice. When planning consider when and how your children will be taught to:

See the words – Hear them – Say them – Use and apply them – Spell them – Record them

It is important that children memorise and manipulate the language of mathematics. When planning consider when and how your children will learn to:

Visualise and manipulate mathematical pictures, diagrams, symbols or words in their heads

Key Mathematical Vocabulary: Year 1	
Number	Count, count out, count up, count back; zero, one, two, three ... twenty; twenty-one, twenty-two ... thirty, thirty-one, thirty-two ... ninety ... ninety-nine, hundred; first, second, third ..., last, last but one; order, compare; digit, units, ones, tens, tens boundary, hundreds boundary; exchange, exchange for ten; number of, quantity, the same number as, as many as; equal to, one more, ten more, one less, ten less; equal to, more than, less than, bigger, bigger than, larger, largest, most; fewer, one fewer, ten fewer, fewest, smaller, smallest, least; too many, too few, enough, not enough, nearly, roughly, about, just under, just over, between, half way, in the middle; even, odd
Calculation	Add, more, plus, sum, total, put together, how many altogether, how many more, one more, bigger by one; subtract, take away, minus, reduce, one less, one fewer, smaller by one; number left, how many fewer, how much less, difference between, distance between; add sign (+), subtraction sign (-), equals sign (=), is the same as; number bond, number sentence, addition, subtraction; double, once, twice, twice as many, two times, pair, pairs, paired; halve, half as many, half of; share, equal shares, share out equally, equal groups of, left, left over; divide, division; count in twos, count in fives, count in tens, array, number of rows, number of columns; equal groups, number of equal groups, total number; multiply, multiplication
Fractions	Whole, part of the whole, equal parts, share equally, equal parts of the whole; two equal parts, half, halves, two halves make a whole; four equal parts, quarter, quarters, four quarters make a whole
Measurement	Measure, size, measurement, quantity; length, height, width, depth; compare, long, as long as, longer, longer than, longest, short, as short as, shorter, shorter than shortest, tall, as tall as, taller, taller than, tallest, wide, as wide as, wider, wider than, widest; narrow, narrower, deep, deeper, shallow, shallower, thick, thicker, thickest, thin, thinner, thinnest; near, nearer, nearest, close, as close as, closer, closest; metre, metre stick; weight, mass, weights, balance; heavy, as heavy as, heavier, heavier than, heaviest, light, as light as, lighter, lighter than, lightest; kilogram; capacity, volume, container, contains, holds; empty, full, as full as, half full, one quarter full, nearly full, nearly empty; day, week, weekend, month, year, birthday, holiday; Monday, ...; morning, afternoon, evening, day night, noon, midnight; January, ...; spring, ...; hours, minutes, seconds; slow, slower, slowest, slowly, quick, quicker, quicker, quickly, fast, faster, fastest, as fast as early, earlier, late, later, as late as; old, older, oldest, new newer, newest; after, before, next, today, tomorrow, yesterday; clock, watch, the hour hand, the minute hand; o'clock, half past, how long to, how long ago; money, coin, note, penny, pence, pound
Geometry	Shape, flat, straight, curved, round, solid, hollow; corner, side; face, edge; point, end, pointed; cube, cuboid, sphere, cylinder, cone, pyramid; triangle, square, rectangle, circle; position, up, down, top, on top of, under, underneath, beneath, below, above, middle, half way, bottom, over, on, in, inside, outside, opposite, next to, near to, in front of, behind, close to, far away, across, centre; direction, forwards, backwards, sideways, towards, away from, nearer to, left, right, turn, whole turn, half turn, quarter turn, three-quarter turn, clockwise, anticlockwise; move, movement, slide, roll, twist, stretch, bend, quick, slow, from, away from, jump, step, hop
Problem solving, Reasoning, Communicating	Try, try next, find, find out; answer, solution, method, attempt, check; start from, start with, start at, arrange, rearrange, put in order, change, organise, separate, join, link, build, draw, record; show, tell, describe, talk about, explain; say what, say why, say how, give a reason, as, so, because, and; same, same as, different, different way, better, best; most, think about, imagine, see in your head

End-of-Year Learning Outcomes for Year 1
A1. Can count forwards and backwards from a given number up to and across 100; read and write numbers to 100 in numerals
A2. Can count out and say how many objects are in a set of objects and use numbers to state quantities
A3. Can decide which of two sets is the larger and know when two sets have an equal number of objects
A4. Can count in multiples of 2, 5 and 10, and say how many objects there are in arrays with 2, 5 or 10 columns or rows
A5. Can compare and order 2-digit numbers, use ordinal numbers, and read and write numbers to 20 in words
A6. Can partition numbers between 11 and 19 into ten and ones and recognise place value in 2-digit numbers
B1. Can add and find the total of two sets of objects and record as a number sentence using +, = signs
B2. Can subtract and find the difference between two sets of objects and record as a number sentence using -, = signs
B3. Can add and subtract pairs of one-digit and two-digit numbers to 20, including zero practically and mentally
B4. Can read, write and interpret addition and subtraction number sentences (+, -, =); solve missing number problems
B5. Can generate and record patterns of addition facts involving pairs of numbers that total 2 to 20
B6. Can use addition facts to work out and record related subtraction facts for numbers up to 20
B7. Can identify one more and one less than a given number and add and subtract 10 to a multiple of 10
B8. Can apply known facts to double and halve quantities; relate grouping and sharing to counting and number patterns
C1. Can identify, name and find halves and quarters of shapes, and share up to 20 objects into equal; groups
A. Measurement
D1. Can compare , describe and measure lengths/heights; recognise and use metres, centimetres
D2. Can compare , describe and measure weight/mass; recognise and use grams, kilograms
D3. Can compare, describe and measure capacity/volume; recognise and use litres, centilitres
D4. Can tell the time using o'clock, half and quarter hours, recognise dates and sequence events over a day and a week
D5. Can identify the value of coins and notes, and use to make amounts of money
E1. Can recognise, name and talk about common 2-D (flat) shapes including squares, rectangles, triangles, circles
E2. Can recognise, name and talk about common 3-D (solid) shapes including cubes, cuboids, pyramids, spheres
E3. Can identify the sides and corners of 2-D (flat) shapes and the faces, edges and vertices of 3-D (solid) shapes
E4. Can describe the position, direction and movement of objects, make and use whole, half and quarter turns
B. Statistics – sorting and classifying
F1. Can sort objects using simple criteria; read, make and use simple lists and tables of information
G1. Can solve problems using practical materials, find and represent solutions with pictures, objects, numbers
G2. Can follow and explain rules to form patterns, sequences and shapes; make and justify choices and decisions
G3. Can talk about their solutions and methods, and describe properties of, relationships between familiar numbers/shapes

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value (within 10)				Number: Addition and Subtraction (within 10)				Geometry: Shape	Number: Place Value (within 20)		Consolidation
Spring	Number: Addition and Subtraction (within 20)				Number: Place Value (within 50) (Multiples of 2, 5 and 10 included)			Measurement: Length and Height		Measurement: Weight and Volume		Consolidation
Summer	Number: Multiplication and Division (Reinforce multiples of 2, 5 and 10 to be included)			Number: Fractions		Geometry: Position and Direction	Number: Place Value (within 100)		Measurement: Money	Measurement: Time		Consolidation

Essential Learning in Mathematics

Summary of Essential Learning in Year 2
• Count forwards and backwards, count in 2s and 5s from zero and in 10s from any number; read and write numbers in numerals and words
• Compare and order numbers to 100; identify the value of the digits in two-digit numbers; partition into tens and ones and tens and 'teens'
• Construct and recall number bonds for 1-digit number to 9 + 9 and use to derive related subtraction facts; apply to multiples of 10; add 10 to any number to 100, and add and subtract one- and two-digit numbers
• Interpret arrays and carry out repeated addition and sharing calculations; read and record multiplication and division number sentences using signs x and ÷; recall and use multiplication facts for 2, 5 and 10; read, write and find halves, thirds, quarters of shapes, quantities and lengths
• Use appropriate standard units to measure; read values on a scale to nearest interval including time to nearest 5 minutes; order lengths, weights, capacities; make up sums of money, record amounts using £ or p
• Name, identify common 2-D and 3-D shapes in different orientations, and describe and use their properties; describe position, direction and movement, relating right-angle turns to quarter turns

Problem Solving, Reasoning, Communicating

- Pupils solve problems that involve reading, writing and comparing numbers to at least 100. They solve missing number problems involving addition and subtraction. Pupils use place value to interpret and represent two-digit numbers when calculating sums and differences, and arrays to solve simple multiplication and division problems. They measure, compare and order lengths, weights, capacities and times, and use coins and notes to solve problems involving money.
- Pupils apply their understanding of number to explore patterns in and relationships between numbers such as odd and even numbers and sequences. They recognise and describe properties of shapes when sorting them and give reasons for their choices. Pupils begin to recognise fractions as numbers as well as parts of whole shapes and quantities.
- Pupils interpret and apply a range of mathematical language to secure a deeper understanding of the relationships between the four number operations. They commit names and number facts to memory and recall the number bonds they use to carry out mental calculations. Pupils count aloud in whole number and fractional steps, to see, identify and talk about the patterns they generate. They describe properties of objects using the language of measure, position and movement.

Language and Mathematics

The ***National Curriculum*** (Section 6: September 2013 Reference DFE-00180-2013) declares that:
"Teachers should develop pupils' spoken language, reading, writing and vocabulary as integral aspects of the teaching of every subject. Pupils should be taught to speak clearly and convey ideas confidently ... They should learn to justify ideas with reasons; ask questions to check understanding; develop vocabulary and build knowledge; negotiate; evaluate and build on the ideas of others ...They should be taught to give well-structured descriptions and explanations and develop their understanding through speculating, hypothesising and exploring ideas. This will enable them to clarify their thinking as well as organise their ideas ... Teachers should develop pupils' reading and writing in all subjects to support their acquisition of knowledge ... with accurate spelling and punctuation."

When we think mathematically we may use pictures, diagrams, symbols and words. We communicate our ideas, reasons, solutions and strategies to others using the spoken and written word. We listen to how others explain their methods using mathematical language and read what they have written so we can interpret their ideas and solutions. Language is a fundamental tool of learning and this is as true for learning mathematics as it is for any other subject. Having a good command of the spoken language of mathematics is an essential part of learning, and for developing confidence in mathematics. Children who say little are usually those who are fearful about saying the wrong thing, or giving an incorrect answer. Very often the quiet children are those who may lack knowledge of, or confidence in using the necessary vocabulary to express their ideas and thoughts to themselves and consequently to others. Mathematics has its own vocabulary which children need to acquire and use. They need to be taught how to pronounce, write and spell the mathematical words they are to use, and to know when they apply and to what they apply. Learning the vocabulary and language of mathematics involves:

- associating objects, shapes and events with their names (e.g. 'x' means multiply; this pyramid has triangles for faces; 60 minutes is an hour)
- stating, repeating and recalling facts aloud, and explaining how they can be used and applied (e.g. 36 is 20 and 16 so when you subtract 18 you take the 8 from the 16; 3 + 15 is the same as 15 +3 and 15 + 3 I can add 3 to get 16, 17, 18, so the answer is 18; quarter past is the same as 15 minutes past)
- describing the relationship between two or more items, shapes, events or sets (e.g. 4 + 7 = 11 so 11 - 7 = 4; the cone is heavier than the sphere; the side of this rectangle is twice as long as the square; in the pictogram 5 more people eat apples each week than those people who eat oranges)
- identifying properties and describing them (e.g. a vertex on a cuboid is where the edges meet; the number 78 has 7 tens and 8 ones so is bigger than 58; this cup holds less than half a litre as there is some water left in my litre measuring jug I filled half way up)
- framing an explanation, reasoning and making deductions (e.g. when I shared out 17 counters between 3 cups I had 2 left over so I need one more to make the shares equal; if you give me five 2 pence coins I will give you a 10 pence coin; you must turn quarter turns when you go round the square)

Learning the Language of Mathematics

Learning to use the language of mathematics requires carefully prepared opportunities and continued experience and practice. When planning consider when and how your children will be taught to:

See the words – Hear them – Say them – Use and apply them – Spell them – Record them

It is important that children memorise and manipulate the language of mathematics. When planning consider when and how your children will learn to:

Visualise and manipulate mathematical pictures, diagrams, symbols or words in their heads

Key Mathematical Vocabulary: Year 2	
Number	Count in steps, count forward, count backward; zero, one, two, three ... twenty; twenty-one, twenty-two ... thirty, thirty-one, thirty-two ... ninety ... ninety-nine, hundred; number track, hundred square, number line, number grid; order, compare; place value, digit, units, ones, tens, teens, hundreds, thousands; one-digit number, two-digit number, three-digit number; partition, exchange, exchange for ten, represents, transfer, place holder; number of, quantity, the same number as, as many as; equal to, one more, ten more, hundred more, one less, ten less, hundred less; equal to, more than, greater than (>), less than (<), bigger, bigger than; fewer, fewest, smaller, smallest, least; nearly, roughly, about, just under, just over, exactly, exact, between, half way, in the middle; even, odd, pair; multiple of two, three, five or ten; sequence, rule
Calculation	Add, plus, sum, total, put together, how many altogether, how many more, calculate, calculation, mental calculation, operation; subtract, take away, minus, reduce, number left, how many fewer, how much less, difference between; add sign (+), subtraction sign (-), equals sign (=); calculate, calculation, mental calculation, operation; number pair, number bond, number sentence, missing number; operation, addition, subtraction; double, once, twice, twice as many, two times, paired; halve, half as many, half of; share, equal shares, share out equally, equal groups of, left, left over; divide, divide by, divide into, division, division fact; count in twos, count in threes, count in fives, count in tens, repeated addition, array, number of rows, number of columns; equal groups, number of equal groups, total number; multiply, multiplication, multiplication fact, multiplication table; order, commutative, commutative operation; multiplication sign (×), division sign (÷)
Fractions	Whole, one whole, fraction, fraction of, part of the whole, equal parts, share equally, equal parts of the whole; two equal parts, half, halves, two halves make a whole; four equal parts, quarter, quarters, three quarters, four quarters make a whole; two quarters make a half; thirds, three equal parts, one third, one third of; unit fraction, equal shares; non-unit fraction; count in quarters, one quarter, two quarters, one half, three quarters, four quarters, one whole, one and one quarter, one and one half ...
Measurement	Units of measure, size, measurement, quantity, scale, measuring scale, interval; length, height, width, depth, thickness; longer than (>), shorter than (<); metre, half a metre, a quarter of a metre, centimetre; metre stick, measuring tape, tape measure, ruler; weight, mass, weights, balance, scales; kilogram, half a kilogram, a quarter of a kilogram, gram; capacity, volume, measuring jug, measuring cylinder; full, half full, one quarter full; litre, half a litre, a quarter of a litre, millilitre; temperature, degree Centigrade (ºC), thermometer; cold colder, freezing, freezing point, hot, hotter, hottest, boil, boiling; seven days, week, fortnight, twelve month, (one year), 24 hours, (one day), 60 minutes (one hour), 60 seconds (one minute); clock, watch, the hour hand, the minute hand; morning, afternoon, evening; o'clock, half past, quarter past, quarter to, five minutes past, 10 minutes past ..., twenty-five minutes to ...; money, coin, note, penny, pence (p), pound (£)
Geometry	Shape, flat, surface, flat surface, straight, curved, circular, triangular, rectangular; corner, side; face, edge, vertex, vertices; cube, cuboid, sphere, cylinder, cone, pyramid, prism; triangle, square, rectangle, quadrilateral, polygon, pentagon, hexagon, octagon, circle; symmetric, line symmetry; straight line, vertical line, horizontal line; shift, forward, backwards, up, down, right, left; turn, rotate, clockwise turn, anti-clockwise turn, quarter turn, right-angle turn, half turn, turn through two right-angles, three-quarter turn, turn through three right-angles, whole turn, turn through four right-angles; sequence, repeat, repetition, pattern, rule, next, before, after
Statistics	Count, number of, quantity, data, category, group, list, table, collect, results; sort, organise, arrange, present; tally, tallies, tally marks, tally chart; picture, diagram, pictogram, blocks, block graph, bars, bar graph; title, label; total, most popular, least popular, most common, least common
Problem solving, Reasoning, Communicating	Name, explore, find, find out, answer, solve, use apply; solution, method, strategy, approach, attempt; arrange, rearrange, compare, order, sort, put in order, organise, combine, combination, separate, join, link, build, draw, record; sign, symbol, notation, resource; identify, show, show how, show why, represent, estimate, describe, discuss, talk about, recite, repeat, recall, explain; say what, say why, say how, say when, give a reason, if, so, as, because, and, not; same, same as, different, different way, better way; think about, ideas, imagine, see in your head, recognise, pattern, relationship, interpret

End-of-Year Learning Objectives for Year 2
A1. Can count forwards from zero and back in multiples of 2s, 5s and 10s and recognise odd and even numbers
A2. Can count forwards and backwards from any number in steps of 1 and 10
A3. Can count in multiples of 10 and 100 and add and subtract the multiples of 10 and 100
A4. Can read and write numbers to at least 100 in numerals and words
A5. Can state the value of the digits in 2-digit numbers, and partition into 10s and 1s, and into 10s and teens
A6. Can compare and order numbers to 100 and the multiples of 10 and 100, record results using <, >, =
B1. Can recall and use addition facts up to 9 + 9 and derive the related subtraction facts
B2. Can add and subtract practically and mentally 1-digit numbers to/from 1- and 2-digit numbers
B3. Can add and subtract practically and mentally two 2-digit numbers and add three single-digit numbers
B4. Can add and subtract mentally 10 and a multiple of 10 to/from 2-digit numbers
B5. Can solve missing numbers problems that involve the addition or subtraction of 1- and 2-digit numbers
B6. Can record addition and subtraction calculations using pictures, partitioning, number lines and in columns
B7. Can multiply by 2, (double), 5 and 10 using counting strategies, arrays and recall the 2, 5 and 10 multiplication tables
B8. Can divide by 2, (halve), 5 and 10 using equal sharing, counting strategies, arrays and recall of multiplication facts
B9. Can read, write and interpret multiplication and division number sentences (x, ÷, =); solve missing number problems
C1. Can read, name and write simple fractions and find halves, thirds, quarters and fifths of quantities in practical context
D1. Can use measuring equipment and read scales to the nearest interval, including temperature in °C
D2. Can choose and use standards units (m and cm) to measure and estimate length; record and compare results
D3. Can choose and use standards units (kg and g) to measure and estimate weight; record and compare results
D4. Can choose and use standards units (l, cl and ml) to measure and estimate capacity; record and compare results
D5. Can recall units of time in hour/day, tell time using quarter hours and 5 minute intervals and sequence intervals of time
D6. Can make/combine amounts of money using coins/notes, give change, use symbols for pounds (£) and pence (p)
E1. Can identify and name 2-D (flat) shapes, describe the sides and corners, identify right angles and lines of symmetry
E2. Can identify and name 3-D (solid) shapes, recognise and count the faces, edges, vertices, and name its faces
E3. Can describe position, direction and movement, including quarter/right-angled turns and forward/backwards motion
F1. Can sort data into categories, draw and interpret simple charts, tables, pictograms and bar charts; interpret results
G1. Can solve practical and word problems that involve the four operations applied to simple and familiar contexts
G2. Can interpret repeating patterns and make predictions; test results, decide what meets conditions and explain why
G3. Can describe, compare and sort quantities and shapes, interpret information and explain solutions and methods

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value			Number: Addition and Subtraction					Measurement: Money		Number: Multiplication and Division	
Spring	Number: Multiplication and Division		Statistics		Geometry: Properties of Shape			Number: Fractions			Measurement: Length and Height	Consolidation
Summer	Geometry: Position and Direction			Problem solving and efficient methods		Measurement: Time		Measurement: Mass, Capacity and Temperature			Investigations	

Essential Learning in Mathematics

Summary of Essential Learning in Year 3
• Count forwards and backwards, count in 2s, 3s, 4s, 5s, 6s, 8s, from zero and in 10s, 100s from any number; recall multiplication facts for 2, 3, 4, 5, 6, 8 and 10
• Compare and order numbers to 1000 and read and write numbers in numerals and words; identify place value of digits in three-digit numbers and partition into hundreds, tens and units, and hundreds and teens
• Add and subtract mentally three-digit numbers to combinations of 1s, 10s, 100s; use formal written methods to add and subtract pairs of three-digits numbers
• Use table knowledge to multiply mentally one-digit and two-digit numbers by combinations of 1s, 10s and to derive division facts; recognise a unit fraction is one part of a whole divided into equal parts and proper fractions as part numbers
• Know relationship between common metric measures; measure and record in mixed standard units including £ and p; read intervals on scales and use to estimate; tell time to nearest minute; interpret data in tables and bar charts
• Build 3-D shapes and draw 2-D shapes and describe them by their properties; recognise angles in shapes and compare them to right angles; make and name combinations of right-angle turns

Problem Solving, Reasoning, Communicating

- Pupils solve problems that involve reading, writing, representing and ordering numbers to at least 1000. When solving contextualised problems they decide which operation to use and why and interpret the solution back on the context and check it makes sense. Pupils solve missing number and scaling problems by multiplying or dividing quantities to scale up or down. They take, and add and subtract measurement. They calculate sums of money and calculate change after purchases. Pupils read and compare times and the durations of events and convert time units to solve problems.
- Pupils extend their knowledge of number and use this to rewrite and rearrange number sentences when calculating and to derive related number facts. They decide when fractions are equivalent and use representations of fractions to order them. They explain the links between finding fractions of quantities and the operation of dividing into equal parts. Pupils interpret data presented in a table or a chart and use the information to compare quantities and back up their observations with a reasoned explanation.
- Pupils draw on an increasing range of mathematical language to share their thinking and to explain their solutions to problems. They read three-digit numbers, stating the value of the digits using place value. Pupils recognise and read unit and non-unit fractions, and use diagrams to represent equivalent fractions. They name sides in shapes using words such as vertical and parallel and describe quarter turns as combinations of right angles.

Language and Mathematics

The ***National Curriculum*** (Section 6: September 2013 Reference DFE-00180-2013) declares that:
"Teachers should develop pupils' spoken language, reading, writing and vocabulary as integral aspects of the teaching of every subject. Pupils should be taught to speak clearly and convey ideas confidently ... They should learn to justify ideas with reasons; ask questions to check understanding; develop vocabulary and build knowledge; negotiate; evaluate and build on the ideas of others ...They should be taught to give well-structured descriptions and explanations and develop their understanding through speculating, hypothesising and exploring ideas. This will enable them to clarify their thinking as well as organise their ideas ... Teachers should develop pupils' reading and writing in all subjects to support their acquisition of knowledge ... with accurate spelling and punctuation."

When we think mathematically we may use pictures, diagrams, symbols and words. We communicate our ideas, reasons, solutions and strategies to others using the spoken and written word. We listen to how others speak mathematics and read what they have written so we can interpret their ideas and solutions. Language is a fundamental tool of learning and this is as true for learning mathematics as it is for any other subject.
Having a good command of the spoken language of mathematics is an essential part of learning, and for developing confidence in mathematics. Children who say little are usually those who are fearful about saying the wrong thing, or giving an incorrect answer. Very often the quite children are those who lack the necessary vocabulary to express their ideas and thoughts to themselves and consequently to others.
Mathematics has its own vocabulary which children need to acquire and use. They need to be taught how to pronounce, write and spell the mathematical words they are to use and know when they apply and to what they apply. Learning the mathematics vocabulary and language of mathematics involves:

- associating objects, shapes and events with their names (e.g. this line is vertical; once around this rectangle is its perimeter; one kg is 1000 grams)
- stating, repeating and recalling facts aloud, and explaining how they can be used and applied (e.g. 174 = 100 + 74 and 74 = 60 + 14 so 147 = 100 + 60 14; I know 8 x 3 = 24 so 80 x 3 = 240 and 240 ÷ 3 = 80; a right angle is a one-quarter turn so a three-quarter turn will be three right angles)
- describing the relationship between two or more items, shapes, events or sets (e.g. X comes after IX and before XI; 11:40 is just before midday; my cube has 6 faces all squares, but my cuboid has rectangle faces; this triangle is the first shape as it has only 3 sides and then comes this rectangle with 4 sides)
- identifying properties and describing them (e.g. the number 367 has 3 hundreds, 6 tens and 7 ones; this coin is 20 pence and five of them make 100p or £1; this square has been divided into six equal parts so each part is one sixth of the square and three parts will be half of it)
- framing an explanation, reasoning and making deductions (e.g. these lines are parallel as they can never meet; I can double the 4 times table to get the 8 times table and the 2 times table is half; the weight is 120 grams as the needle is pointing two gaps above 100 and the gaps are each 10 grams)

Learning the Language of Mathematics

Learning to use the language of mathematics requires carefully prepared opportunity and continued experience and practice. When planning consider when and how your children will be taught to:

See the words – Hear them – Say them – Use and apply them – Spell them – Record them

It is important that children memorise and manipulate the language of mathematics. When planning consider when and how your children will learn to:

Visualise and manipulate mathematical pictures, diagrams, symbols and words in their heads

Key Mathematical Vocabulary: Year 3	
Number	Count from, in steps, in multiples of, count forward, count backward; zero, one ..., eleven, twenty-two, thirty-two ... ninety-one, ... ninety-nine, one hundred, two hundred ..., nine-hundred and fifteen, eight-hundred and fifteen ..., one thousand; number track, hundred square, number line, number grid; place value, digit, units, ones, tens, teens, hundreds, thousands; one-digit number, two-digit number, three-digit number; partition, exchange, exchange for ten, exchange for one hundred, exchange for ten tens; numerals, place holder; quantity, the same number as, equivalent to; equal to, ten more, hundred more, ten less, hundred less; more than, greater than (>), less than (<), bigger, bigger than; fewer, fewest, least; nearly, estimate, estimation, round up, round down, approximate, approximately, check, just under, just over, exactly, exact; even, odd, paired
Calculation	Add, increase, addition, plus, sum, total; subtract, subtraction, decrease, minus, fewer, less, difference between; add sign (+), subtraction sign (-), equals sign (=); calculate, calculation, mental calculation, formal written method, columnar method; double, once, twice, two times as big, four time as heavy, eight times as high, ten times as many, scale up; halve, half as many, half of; share, equal shares, share out equally, equal groups of, left, left over, remaining; divide, divide by, divide into, division, factor, division fact, short division, scale down; count in twos ... tens ... hundreds, repeated addition, array, rows, columns; number of equal groups; multiply, multiple, product, multiplication, multiplication fact, multiplication table, short multiplication; multiplication sign (×), division sign (÷); commutative rule, commutative operation, associative, associative rule; inverse operation
Fractions	Whole, one whole, fraction, denominator, numerator, unit fraction, non-unit fraction; fraction of, part of the whole, equal parts, share equally, equal parts of the whole; half, halves, two halves make a whole; four equal parts, quarter, quarters, four quarters make a whole; two quarters make a half; thirds, three equal parts, one third, one third of; fifths, sixths, sevenths, eights, ninths, tenths; count in tenths, one tenth, two tenths ... ten tenths, one whole, one and one tenth, one and two tenths ...; decimal numbers, decimal point; whole number boundary, ones, tenths; equivalent fractions
Measurement	Units of measure, size, measurement, quantity, scale, measuring scale, equivalent units, mixed units, interval, value of interval; length, height, width, depth, thickness, perimeter; longer than (>), shorter than (<); standard units of length, metre, centimetre, millimetre; metre stick, measuring tape, ruler; weight, mass, weights, balance, scales; standard units of weight, mass, kilogram, gram; measuring jug, standard units of capacity, volume, litre, millilitre; temperature, degree Centigrade (ºC), thermometer; cold colder, freezing, freezing point, boiling; calendar, days in the month, days in a year, leap year, seven days, week, fortnight, twelve months, (one year), 24 hours, (one day), 60 minutes (one hour), 60 seconds (one minute); duration, sequence of events; 12-hour clock, analogue clock; a.m., p.m., morning, afternoon, evening, noon, midnight; seven minutes past, twenty-six minutes past ..., twenty-eight minutes to ...; Roman numerals, I, II, III, IV, V, VI, VII, VIII,IX, X, XI, XII; pence (p), pound (£); expensive, cheap
Geometry	Shape, flat, 2-D shape, solid 3-D shape, surface, flat surface, straight, curved, circular, triangular, rectangular; corner, side; face, edge, vertex, vertices; cube, cuboid, sphere, cylinder, cone, pyramid, prism; triangle, square, rectangle, quadrilateral, polygon, pentagon, hexagon, octagon, circle; symmetric, line of symmetry, vertical line, horizontal line; shift, horizontally, vertically, orientation; turn, rotate, clockwise turn, anti-clockwise turn, quarter turn, right-angle turn, half turn, turn through two right-angles, three-quarter turn, turn through three right-angles, whole turn, turn through four right-angles; smaller than one right angle, acute angle, greater than one right angle, obtuse angle; perpendicular lines, parallel lines
Statistics	Count, number of, quantity, data, category, group, list, table, collect, results; sort, organise, arrange, present, interpret, information; tally, tallies, tally marks, tally chart; picture, diagram, pictogram, blocks, block graph, bars, bar graph; title, label; number fewer, least number, total number, maximum number; read scale, unit size, number of units represented, units per interval, units per picture
Problem solving, Reasoning, Communicating	Name, explore, investigate, find out, use, apply, analyse, interpret; solution, method, strategy, approach; choose, decide; rearrange, organise, greatest value, least value; combine, separate, join, link; build, draw, represent, sketch, measure, record, show your working; sign, symbol, notation, resource; identify, show how, show why, represent, estimate, approximate, describe, discuss; recite, repeat, remember, recall; explain why, what, how, when; give a reason, if, so, as, because, and, not, cannot; same, same as, different, example, counter-example; visualise, imagine, see in your head, recognise, pattern, relationship; sequence, term, position, next, previous, generate, continue, extend, predict, rule, describe the rule, test

End-of-Year Learning Objectives for Year 3
A1. Can count forwards and backwards in multiples of 1, 2, 3, 4, 5, 6, 8, 10 and 100; state 10 or 100 more/less than a number
A2. Can order, read and write in numerals and in words, numbers up to 1000; read numbers using Roman numerals: I, V, X
A3. Can identify the value of digits in 3-digit numbers and partition into 100s, 10s and 1s, and into 100s, 10s and teens
B1. Can add and subtract mentally 1s, 10s, 100s to 3-digit numbers and combinations of 1-digit and 2-digit whole numbers
B2. Can use formal written column methods for the addition and subtraction of pairs of whole numbers with up to 3 digits
B3. Can use the relationships between addition and subtraction to derive facts and solve missing number problems
B4. Can use place value to estimate and to check calculations
B5. Can derive and recall multiplication facts for the 2, 3, 4, 5,6, 8, 10 times tables and use when calculating
B6. Can derive, recall and use division facts from multiplication facts in the 2, 3, 4, 5,6, 8, 10 times tables
B7. Can apply the commutative and associative rules to re-organise and carry out calculations
B8. Can use reliable written methods to multiply and divide 2-digit numbers by 1-digit numbers
C1. Can read and write unit and non-unit proper fractions and identify simple fractions on a number line
C2. Can relate fractions to division through equal sharing and work out fractional parts in practical contexts
C3. Can compare and order unit fractions and fractions with the same denominator
C3. Can count up and down in tenths, recognise ten tenths is one whole and express one whole with other fractions
C4. Can identify equivalent fractions with small denominators; determine if a fraction is <, =, or > to one whole
C5. Can add and subtract fractions with same denominator where the answer is less than or equal to 1; represent this practically
D1. Can measure length accurately, record and compare lengths using m, cm, mm units, measure perimeter of simple shapes
D2. Can measure weight accurately, record and compare weights using kg, g units
D3. Can measure capacity accurately, record and compare capacities using l, ml units
D4. Can read and record time to the nearest minute, compare durations, read time on clocks with Roman numerals
D5. Can use £ and p to compute sums of money and give change in practical contexts
E1. Can draw and name 2-D shapes, describe their properties and recognise angles as a property of shape
E2. Can build 3-D shapes, recognise and name 3-D shapes in different orientations and describe their properties
E3. Can recognise and use right angles to measure quarter, half, three-quarter and whole turns and to compare angles
F1. Can present, interpret and interrogate data in tables, pictograms, bar charts; read and use scales with non-unit intervals
G1. Can solve money, time, measures and missing number problems involving addition and subtraction
G2. Can rewrite number sentences, compare shapes and angles, give reasons as to why properties are the same or different
G3. Can explain and interpret solutions in the context of the problem; describe properties of shapes using accurate language

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value			Number: Addition and Subtraction					Number: Multiplication and Division			Consolidation
Spring	Number: Multiplication and Division			Measurement: Money	Statistics		Measurement: Length and Perimeter			Number: Fractions		Consolidation
Summer	Number: Fractions			Measurement: Time			Geometry: Properties of Shape		Measurement: Mass and Capacity			Consolidation

Essential Learning in Mathematics

Summary of Essential Learning in Year 4
• Count in single-digit multiples, and in 10s, 100s, 1000s from any number; use negative numbers to count backwards through zero
• Compare and order numbers beyond 1000; identify the place value of the digits in four-digit numbers and partition and recombine; round to nearest 10, 100 or 1000; in context, read, write and compare decimals up to hundredths
• Add and subtract mentally combinations of multiples of 1, 10, 100, 1000; use formal written methods to add and subtract numbers with up to four digits
• Recall multiplication facts to 12 x 12; use to derive division facts, and to multiply and divide multiples of 10 and 100 by single-digit numbers; use formal methods to record multiplication of two-digit and three-digit numbers by one-digit numbers; find unit and non-unit fractions of quantities; recognise equivalents
• Measure and convert between common standard units of measure including money and time; find and compare the perimeters and areas of rectangles; present small data sets as bar charts or time graphs and interpret and interrogate results
• Name, classify angles up to two right angles, and triangles and quadrilaterals with special properties; identify and use line symmetry; plot points in the first quadrant of coordinate grids and describe translations

Problem Solving, Reasoning, Communicating

- Pupils solve problems that involve more than one step. They determine which operations to use and the order in which they are to carry them out. Pupils interpret and use information from tables and graphs that show discrete data, and compare and manipulate the frequencies or the quantities displayed. They interpret continuous data in time graphs and describe the changes that have taken place over the period of time represented by the graph. Pupils solve measure and money problems that involve the interpretation of decimal numbers and problems that require the manipulation of simple fractions. They convert between common units of measure to simplify or to set the solution in an appropriate context.
- Pupils extend their knowledge of the four operations and their understanding of the relationships between them. They use the associative and distributive laws to re-write and carry out mental and written calculations drawing on their knowledge of place value and partitioning to explain their reasons for applying these methods. Pupils use unit and non-unit fractions to describe and determine parts of a shape or a quantity and relate the fractions to equal parts of a whole, quantities or sets of items. Pupils recognise that an angle is formed by turning about a point and is a property of a 2-D shape. They use this knowledge to reason and to decide whether a shape does or does not belong to particular and special classes of shapes.
- Pupils read increasingly large numbers, recognise the value of the digits, and begin to interpret tenths and hundredths in decimal numbers. They identify positive and negative numbers as they count forwards and backwards. Pupils name an increasing number of 2-D and 3-D shapes and identify and describe their angular properties and any lines of symmetry. They find the perimeters and areas of rectangles and simple rectilinear shapes. Pupils use coordinates in the first quadrant to describe the position of points on a plane and the movement of points as translations.

Language and Mathematics

The ***National Curriculum*** (Section 6: September 2013 Reference DFE-00180-2013) declares that:
"Teachers should develop pupils' spoken language, reading, writing and vocabulary as integral aspects of the teaching of every subject. Pupils should be taught to speak clearly and convey ideas confidently ... They should learn to justify ideas with reasons; ask questions to check understanding; develop vocabulary and build knowledge; negotiate; evaluate and build on the ideas of others ...They should be taught to give well-structured descriptions and explanations and develop their understanding through speculating, hypothesising and exploring ideas. This will enable them to clarify their thinking as well as organise their ideas ... Teachers should develop pupils' reading and writing in all subjects to support their acquisition of knowledge ... with accurate spelling and punctuation."

When we think mathematically we may use pictures, diagrams, symbols and words. We communicate our ideas, reasons, solutions and strategies to others using the spoken and written word. We listen to how others explain their methods using mathematical language and read what they have written so we can interpret their ideas and solutions. Language is a fundamental tool of learning and this is as true for learning mathematics as it is for any other subject. Having a good command of the spoken language of mathematics is an essential part of learning, and for developing confidence in mathematics. Children who say little are usually those who are fearful about saying the wrong thing, or giving an incorrect answer. Very often the quiet children are those who may lack knowledge of, or confidence in using the necessary vocabulary to express their ideas and thoughts to themselves and consequently to others.
Mathematics has its own vocabulary which children need to acquire and use. They need to be taught how to pronounce, write and spell the mathematical words they are to use, and to know when they apply and to what they apply. Learning the vocabulary and language of mathematics involves:

- associating objects, shapes and events with their names (e.g. L is 50 and C is 100; 4 and 5 are a factor pair of 20; any quadrilateral has 4 straight sides)
- stating, repeating and recalling facts aloud, and explaining how they can be used and applied (e.g. 234 - 44 is 234 - 34 - 10, which makes the answer 200 - 10 = 190; 53 is 50 + 3, I can write 53 x 8 as 50 x 8 plus 3 x 8; a rhombus has 4 sides the same length like a square but the angles are not right angles)
- describing the relationship between two or more items, shapes, events or sets (e.g. 15:15 is half an hour after 14:45; the fraction ½ is in the middle of the 0 to 1 number line and ¾ is half way between ½ and 1; these three rectangles are each 20 square cm but their lengths,10cm, 5cm, and 20cm, are not equal)
- identifying properties and describing them (e.g. when you divide 100 by 1 you get 100 as 100 is 100 ones; this point on the grid is 3 along and 7 up so the coordinates are (3, 7); the 50 times table is like the 5 times table with an extra zero; this isosceles trapezium is like an isosceles triangle with its top cut off)
- framing an explanation, reasoning and making deductions (e.g. I knew that 2 x 4 x 5 is 40 as 2 x 5 is 10 and 10 x 4 is 40; this rectangle must have 2 lines of symmetry as all rectangle do; 60 minutes in 1 hour means if I sleep for 10 hours this is 600 minutes; 548 rounds to 500 because 48 is less than 50, half way between 500 and 600)

Learning the Language of Mathematics

Learning to use the language of mathematics requires carefully prepared opportunity and continued experience and practice. When planning consider when and how your children will be taught to:

See the words – Hear them – Say them – Use and apply them – Spell them – Record them

It is important that children memorise and manipulate the language of mathematics. When planning consider when and how your children will learn to:

Visualise and manipulate mathematical pictures, diagrams, symbols and words in their heads

Key Mathematical Vocabulary: Year 4	
Number	Count in multiples of, count forward, count backwards through zero, consecutive; positive number, above zero, below zero, negative number, integer; negative one, negative two ..., minus one, minus two ..., number line; one thousand, ten thousand, ten thousand and one ..., one hundred thousand, one hundred thousand and one ..., one hundred thousand one hundred and one ... one hundred and one thousand one hundred and one; place value, digit, units, ones, tens, teens, hundreds, thousands, ten thousands, hundred thousands; single-digit number ... four-digit number ... six-digit number; Roman numerals, I ... IV, V, VI ... IX, X, XI ... XXXIX, XL, XLI ... XLIX, L, LI, LII ... LX, LXI ... XCVIII, XCIX, C; partition, exchange, exchange for one thousand, exchange for ten hundreds; numerals, place holder; hundred more/less, thousand more/less; greater than (>), less than (<); fewer, fewest, least; estimate, round up/down, approximate, check, round to nearest ten, nearest hundred ... nearest thousand
Calculation	Addition, increase, sum, total; subtraction, take away, decrease, fewer, less, difference between; add sign (+), subtraction sign (-), equals sign (=); calculate, calculation, mental calculation, formal written method, columnar method; double, scale up; halve; share out equally, equal groups of, left, left over, remaining; divide, divide by, divide into, divisible by, quotient, factor, factor pair, division fact, short division, scale down; count in twos ..., count in tens, count in hundreds, repeated addition, array, rows, columns; number of equal groups; multiply, multiple, product, multiplication, short multiplication, multiplication fact, multiplication table; multiplication sign (×), division sign (÷); commutative rule, commutative operation, associative, associative law, distributive law; inverse, inverse operation; scale up, scale down, 4 times as heavy, holds 3 times the amount, twice as tall
Fractions	Whole, one whole, fraction, denominator, numerator, unit fraction, non-unit fraction, equivalent fractions, simplify; fraction of, proportion, equal parts, share equally, equal parts of the whole; halves, two halves make a whole; quarters, four quarters make a whole; two quarters make a half; thirds, one third, one third of ... three thirds make a whole ... fifths, sixths, sevenths, eights, ninths, tenths, hundredths; one eight, two eights ... eight eighths, one whole, one and one eight, one and two eights ...; decimal numbers, decimal point, decimal place, one decimal place, two decimal places; whole number boundary, ones, tenths, hundredths; round to nearest whole number; £.p
Measurement	Units of measure, metric unit, measurement, quantity, scale, equivalent units, convert, conversion, mixed units, intervals, value of interval; length, perimeter; standard units of length, kilometre, metre, centimetre, millimetre; metre stick, measuring tape, ruler; weight, mass, scales; standard units of weight, kilogram, gram; measuring jug, standard units of capacity, volume, litre, millilitre; temperature, degree Centigrade (ºC), thermometer; cold colder, freezing, freezing point, boiling; calendar, leap year, seven days, week, fortnight, twelve months, (one year), 24 hours, (one day), 60 minutes (one hour), 60 seconds (one minute); duration, sequence of events; analogue clock, digital clock, 12-hour clock, 24-hour clock; a.m., p.m., noon, midnight; thirteen fifty, fifty minutes past one p.m., ten to two in the afternoon; area of 2-D shape, square centimetres
Geometry	Point; shape, flat, 2-D shape, perimeter, distance around, area, space inside; 3-D shape, surface, flat surface, straight, triangular, rectangular, circle, circular; corner, side; face, edge, vertex, vertices; cube, cuboids, sphere, cylinder, cone, pyramid, prism; triangle, isosceles, equilateral; quadrilateral, square, rectangle, parallelogram, rhombus, trapezium, kite; polygon, pentagon ... decagon, regular, irregular; symmetric, line of symmetry, reflect, reflection, vertical line, horizontal line; orientation; turn, rotate, clockwise, anti-clockwise, quarter turn, right-angle turn; smaller than one right angle, acute angle, between one and two right angles, obtuse angle; perpendicular lines, parallel lines; coordinates, plot, axes, quadrant; shift, translation
Statistics	Count, frequency, discrete data, category; measure, continuous data, time, changes over time, trend; table, group, sort, organise, arrange, present, interpret, information; tally chart, frequency table; pictogram, blocks, block graph, bars, bar graph, time graph; title, label; number fewer, least number, total number, maximum number; scale, unit size, number of units represented, units per interval, units per picture
Reasoning and solving problems	Explore, investigate, use, apply, analyse, interpret; solution, method, strategy; rearrange, organise, maximum, minimum; combine, separate, join, link; build, draw, represent, sketch, measure, record, show your working; sign, symbol, notation, resource; show how, show why, represent, identify; recite, repeat, recall; explain why, what, how, when; give a reason, justify, if, so, as, because, and, not, cannot; same, same as, different, example, counter-example; visualise, imagine, see in your head, pattern, relationship; sequence, term, position, generate, predict, rule, rule, test

End-of-year Learning Objectives for Year 4
A. Number – counting and place value
A1. Can count in single-digit multiples and multiples of 25, 50, 100, 1000; count backwards to include negative numbers.
A2. Can read, write and order whole numbers with 4 or more digits; read numbers using Roman numerals: I,V,X,L, C.
A3. Can use place value to compare and partition 4-digit whole numbers and decimal numbers with 1 or 2 decimals places.
A4. Can round numbers to the nearest 10,100 and 100 and round decimals with 1 decimal place to the nearest whole number.
B. Number- Calculation (written and mental)
B1. Can add and subtract mentally 2-digit numbers and multiples of 10, 100 and 1000
B2. Can add and subtract mentally quantities of money in £s and pence and measurements that involve different units.
B3. Can recall the multiplication tables to 12 x 12, derive related multiplication and division facts and identify factor pairs.
B4. Can use the formal written column methods to add and subtract numbers with up to four digits.
B5. Can use number facts and the rules of arithmetic to re-write number expressions and carry out calculations.
B6. Can use a formal written method to multiply 2-digit and 3-digit numbers by a single-digit number.
C. Number – fractions (including decimals)
C1.Can construct practically families of equivalent fractions and add and subtract fractions with the same denominators.
C2. Can find unit and non-unit fractional parts of quantities where the answer is a whole number.
C3. Can count up and down in hundredths, recognise and record halves, quarters, tenths, hundredths as decimals.
C4. Can interpret answers to division of 1-digit and 2-digit whole numbers by 10 or 100 as tenths and hundredths.
C5. Can recognise that as the numerator of a fraction with fixed denominator increased the fraction gets bigger.
D. Measurement
D1. Can measure accurately using metric units for length, weight, capacity, and convert between different common units.
D2. Can measure and calculate the perimeter of rectangles and composite rectilinear shapes using metric units.
D3. Can find the areas of rectangles and composite rectilinear shapes using metric units.
D4. Can read and interpret times presented in 12-hour and 24-hour notation, convert units and calculate time intervals.
E. Geometry – properties of shapes, position and direction
E1. Can draw lines and 2-D shapes accurately; use properties to classify and name triangles and quadrilaterals by type
E2. Can plot points on a coordinate grid in the first quadrant and draw a complete shapes in different orientations.
E3. Can describe relative positions of points and shapes as translations to left/right and up/down.
E4.Can name and compare acute and obtuse angles by size; recognise equal lengths and angles in regular polygons.
E5. Can identify lines of symmetry in 2-D shapes and complete 2-D shapes given a line of symmetry.
F. Statistics- interpret discrete and continuous data
F1. Can organise, present and interpret discrete data in frequency tables, pictograms and bar charts using non-unit scales.
F2. Can organise, present and interpret continuous data in tables and time graphs; explain changes over time.
G. Problem solving, reasoning, communicating
G1. Can solve 2-step problems involving money, measures, time, fractions; use multiplication/division to scale up or down.
G2. Can provide reasons for choosing operations to solve problems and for using particular properties to classify shapes.
G3. Can use the language of fractions, decimals and negative numbers when counting, comparing and sorting numbers.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value				Number: Addition and Subtraction			Measurement: Length and Perimeter		Number: Multiplication and Division		
Spring	Number: Multiplication and Division			Measurement: Area	Number: Fractions				Number: Decimals			Consolidation
Summer	Number: Decimals		Measurement: Money		Measurement: Time		Statistics	Geometry: Properties of Shape		Geometry: Position and Direction		Consolidation

Essential Learning in Mathematics

Summary of Essential Learning in Year 5
• Count forwards and backwards from any number in powers of ten including through zero; interpret negative numbers and Roman numerals in context; determine prime, square and cube numbers
• Identify the value of digits in whole and decimal numbers; round numbers to the nearest power of ten and decimals to nearest whole number and to one decimal place; write decimals and percentages as fractions
• Add and subtract mentally pairs of numbers with up to four digits; use formal written methods to add and subtract whole numbers and decimal numbers in context; add and subtract fractions with related denominators
• Recall and use multiplication facts to 12 x 12 to multiply and divide mentally and identify factors and multiples; use formal methods to multiply numbers with up to four digits by 1- or 2-digit numbers, and to divide numbers with up to four digits by 1- or 2-digit numbers; multiply whole numbers by proper fractions to get whole number answers
• Convert between units of measure and time; calculate the perimeter and area of rectangles and composite shapes and volumes of cuboids; read, interpret and use data presented in tables, line and time graphs
• Recognise and name 3-D shapes from 2-D drawings; draw straight lines accurately and draw and measure angles in degrees; apply the properties of triangles and rectangles and identify regular polygons; reflect and translate shapes on grids including the coordinates in the first quadrant

Problem Solving, Reasoning, Communicating

- Pupils solve problems that involve two or more steps and a range of measures and decimal numbers. They use and convert between standard metric units and begin to use approximate equivalents for the most common imperial units of measure where the context makes it appropriate. Pupils apply the four operations and combinations of these operations to logic problems that involve finding missing values or optimum solutions that meet given conditions. They apply scaling to given measurements to calculate the increases or decreases between a scale drawing and its realisation. Pupils read and interpret information presented in tables, including timetables, and graphs, including line graphs that show a relationship between two continuous variables such as temperature and time. They solve problems that require the calculation of simple fractional and percentage parts of quantities in order to compare the size of the proportional parts.
- Pupils use their knowledge of factors and multiples to sort and test relationships between numbers. They determine whether a number is prime, square or a cube and offer reasons for their decisions. Pupils generate linear sequences and describe in words the term-to-term rule. They use properties of angles at a point or on a straight line to calculate missing angles, explaining how they arrived at their answers. Pupils explore the properties of familiar shapes and begin to make and test deduction about lengths of sides and the angles.
- Pupils read positive and negative numbers accurately, convert between decimal numbers and fractions and translate percentages into fractions. They explain how to order, add and subtract fractions that are multiples of the same number and read and interpret improper fractions and mixed numbers. Pupils describe the effect of multiplying and dividing whole numbers by 10, 100, or 1000. Pupils read angles in degrees and name angles by their size. They describe reflections and relate a reflection to lines of symmetry, find the position of points following a reflection or translation.

Language and Mathematics

The ***National Curriculum*** (Section 6: September 2013 Reference DFE-00180-2013) declares that:
"Teachers should develop pupils' spoken language, reading, writing and vocabulary as integral aspects of the teaching of every subject. Pupils should be taught to speak clearly and convey ideas confidently ... They should learn to justify ideas with reasons; ask questions to check understanding; develop vocabulary and build knowledge; negotiate; evaluate and build on the ideas of others ...They should be taught to give well-structured descriptions and explanations and develop their understanding through speculating, hypothesising and exploring ideas. This will enable them to clarify their thinking as well as organise their ideas ... Teachers should develop pupils' reading and writing in all subjects to support their acquisition of knowledge ... with accurate spelling and punctuation."

When we think mathematically we may use pictures, diagrams, symbols and words. We communicate our ideas, reasons, solutions and strategies to others using the spoken and written word. We listen to how others explain their methods using mathematical language and read what they have written so we can interpret their ideas and solutions. Language is a fundamental tool of learning and this is as true for learning mathematics as it is for any other subject. Having a good command of the spoken language of mathematics is an essential part of learning, and for developing confidence in mathematics. Children who say little are usually those who are fearful about saying the wrong thing, or giving an incorrect answer. Very often the quiet children are those who may lack knowledge of, or confidence in using the necessary vocabulary to express their ideas and thoughts to themselves and consequently to others. Mathematics has its own vocabulary which children need to acquire and use. They need to be taught how to pronounce, write and spell the mathematical words they are to use, and to know when they apply and to what they apply. Learning the vocabulary and language of mathematics involves:

- associating objects, shapes and events with their names (e.g. M is 1000, CM is 900; $4^3 = 4 \times 4 \times 4$; cm^2 represents square cm; this makes it a reflex angle)
- stating, repeating and recalling facts aloud, and explaining how they can be used and applied (e.g. one tenth is 10% so three tenths is 30%; 15 030 is 15 thousand and 30 so take away 9 020 will leave 6 thousand and 10; the diagonals of a rectangle cross to make four triangle which are all isosceles)
- describing the relationship between two or more items, shapes, events or sets (e.g. only this fraction is bigger than one as the denominator is bigger than the numerator; 37 must be prime as I cannot find any factors but 27 is not prime as $3 \times 9 = 27$; the 16:48 train is after the 4.25pm train)
- identifying properties and describing them (e.g. a right angle is 90° and this reflex angle is 3 right angles so is 3×90°; when I reflect the shape it does not change shape only position and now it points in a down; the numbers in this sequence are getting bigger as I add a quarter each time)
- framing an explanation, reasoning and making deductions (e.g. I know the polygon I made has equal sides but this angle is bigger than this one so it is not regular; 48 is not a square number as $7^2 = 7 \times 7 = 49$; 63 divided by 5 has remainder 3, I think numbers with 3 units will have remainder 3 if I divide by 5)

Learning the Language of Mathematics

Learning to use the language of mathematics requires carefully prepared opportunity and continued experience and practice. When planning consider when and how your children will be taught to:

See the words – Hear them – Say them – Use and apply them – Spell them – Record them

It is important that children memorise and manipulate the language of mathematics. When planning consider when and how your children will learn to:

Visualise and manipulate mathematical pictures, diagrams, symbols and words in their heads

Key Mathematical Vocabulary: Year 5	
Number	Count in multiples of, count forward, count backwards through zero, consecutive; positive number, below zero, negative number, integer; negative one, negative two ..., minus one, minus two ..., number line; one thousand, ten thousand, ten thousand and one ..., one hundred thousand, one hundred thousand and one ..., one hundred thousand one hundred and one ... one hundred and one thousand one hundred and one ... million; place value, digit, units, ones, tens, ... ten thousands, hundred thousands, millions; single-digit number ... seven-digit number; Roman numerals, I ... IV, V, VI ... IX, X, XI ... XXXIX, XL, XLI ... XLIX, L, LI, LII ... LX, LXI ...C ... CDXCIX, D... CMXCIX, M ... MMXIV; partition, exchange, exchange for one thousand, exchange for ten hundreds; numerals, place holder; greater than (>), less than (<); fewer, fewest, least; estimate, round up/down, approximate, check, round to nearest ten, nearest hundred ... nearest hundred thousand; prime, prime number, square, cube
Calculation (mental and written)	Addition, increase, sum, total; subtract, subtraction, take away, decrease, fewer, less, difference between; add sign (+), subtraction sign (-), equals sign (=), equivalence; calculate, calculation, mental calculation, formal written method, columnar method; double, scale up; halve; share out equally, equal groups of, left, left over, remainder; divide, divide by, divide into, divisible by, quotient, remainder after division; factor, factor pair, prime factor, composite number, division fact, short division, scale down; count in twos ..., count in tens, count in hundreds, repeated addition, array, rows, columns; number of equal groups; multiply, multiple, product, multiplication, short multiplication, multiplication fact, multiplication table; multiplication sign (×), division sign (÷); commutative rule, commutative operation, associative, associative law, distributive law; inverse, inverse operation
Fractions	Whole, proper fraction, improper fraction, mixed number, denominator, numerator, unit fraction, non-unit fraction, equivalent fractions, simplify, cancel; fraction of, proportion, equal parts, share equally; halves; quarters, four quarters make a whole; two quarters make a half; thirds, one third, one third of ... three thirds make a whole ... fifths, sixths, sevenths, eights, ninths, tenths, hundredths, thousandths; one eight, two eights ... eight eighths, one whole, one and one eight, one and two eights ...; decimal numbers, decimal point, decimal place, one decimal place ... three decimal places; whole number boundary, bridging zero; ones, tenths, hundredths; round to nearest whole number, percentage (%), parts per hundred
Measurement	Units of measure, metric unit, imperial unit, yard, pound, pint; measurement, scale, scale drawing; equivalent units, convert, conversion, mixed units, intervals, value of interval; length, perimeter; standard units of length, kilometre, metre, centimetre, millimetre; weight, mass, scales; standard units of weight, kilogram, gram; standard units of capacity, volume, litre, millilitre; temperature, degree Centigrade (ºC), thermometer; cold colder, freezing, freezing point, boiling; calendar, leap year, seven days, week, fortnight, twelve months, (one year), 24 hours, (one day), 60 minutes (one hour), 60 seconds (one minute); duration, sequence of events; analogue clock, digital clock, 12-hour clock, 24-hour clock; a.m., p.m., noon, midnight; thirteen fifty, fifty minutes past one p.m., ten to two in the afternoon; area of 2-D shape, square cm (cm^2), square m (m^2); volume cubic cm (cm^3)
Geometry	Point; plane, 2-D shape, perimeter, area; straight, triangular, rectangular, rectilinear, composite, circle, circular; corner, side; 3-D shape, surface, flat surface, face, edge, vertex, vertices; cube, cuboid, sphere, cylinder, cone, pyramid, prism; triangle, isosceles, equilateral; quadrilateral, square, rectangle, parallelogram, rhombus, trapezium, kite; polygon, pentagon ... decagon, regular, irregular; symmetric, line of symmetry, vertical, horizontal; orientation; rotate, clockwise, anti-clockwise, degrees, protractor, right-angle turn (90º); acute (< 90º) acute (> 90º, < 180º), reflex (> 180º) reflex angle; half turn (180º), angles about a point (360º); perpendicular, parallel lines; coordinates, plot, axes, quadrant; translation, reflect, reflection
Statistics	Count, frequency, discrete data, category; measure, continuous data, time, changes over time, trend; table, group, sort, organise, arrange, present, interpret, information; tally chart, frequency table; pictogram, blocks, block graph, bars, bar graph, time graph, line graph; title, label; number fewer, least number, total number, maximum number; scale, unit size, number of units represented, units per interval, units per picture
Problem solving, Reasoning, Communicating	Explore, investigate, use, apply, analyse, interpret; solution, method, strategy; rearrange, organise, maximum, minimum; combine, separate, join, link; build, draw, represent, sketch, measure, record, show your working; sign, symbol, notation, resource; show how, show why, represent, identify; recite, repeat, recall; explain why, what, how, when; give a reason, justify, if, so, as, because, and, not, cannot; same, same as, different, example, counter-example; visualise, imagine, see in your head, pattern, relationship; sequence, term, position, generate, predict, rule, rule, test

End-of-Year Learning Objectives for Year 5
A1. Can read, write and order whole numbers with 6 or more digits and identify the values of the digits
A2. Can read, write and order decimal numbers with up to 3 places and identify the values of the digits
A3. Can count forwards and backwards in powers of 10, round to nearest power of 10, round decimals to whole numbers and tenths
A4. Can read, write and interpret negative numbers and count through zero
A5. Can read numbers written using Roman numerals: I, V, X, L, C, D, M
B1. Can add and subtract mentally 1- and 2-digit numbers and multiples of 10, 100, 1000 to and from given whole numbers
B2. Can use formal written methods to add and subtract whole 4-digit numbers and decimal numbers with up to 3 places
B3. Can recall the multiplication tables to 12 x 12 and use to identify factor pairs and common factors of two numbers
B4. Can use known facts to multiply and divide mentally including multiplying and dividing by 10, 100 and 1000
B5. Can use efficient formal written methods to multiply numbers with up to 4-digits by a 1- or 2-digit number
B6. Can use efficient formal written methods to divide numbers with up to 4-digits by a 1- or 2-digit number
B7. Can use rounding to give approximate solutions to calculations and check answers
B8. Can record the remainder after division in different ways and interpret remainders in the context of the problem
B9. Can identify, recognise and use common prime numbers, square numbers and cube numbers
C1. Can order, name, write and convert between mixed numbers and improper fractions and generate equivalent fractions
C2. Can compare, add and subtract fractions whose denominator are multiples of the same number
C3. Can express fractions whose denominators are multiples of 100, 10, 5 and 2 as percentages and decimal equivalents
D1. Can measure accurately using metric units for length, weight, capacity and convert between common metric units
D2. Can calculate the perimeter of composite rectilinear shapes and the area of simple rectangular shapes in cm^2
D3. Can estimate volume and capacity using practical resources
D4. Can convert between units of time, read and use 12-hour and 24-hour notation, and calculate time intervals
E1. Can draw angles in degrees, estimate, compare and name angles
E2. Can identify and use the sums of angles at a point, on a straight line and other 90º multiples to calculate missing angles
E3. Can describe and use the properties of rectangles and regular polygons to determine related facts
E4. Can translate and reflect shapes, use coordinates in the first quadrant to describe position and movement of shapes
F1. Can read, interpret and represent data in tables, including timetables, and use information presented in a line graph
G1. Can solve problems involving time, money, measures, use links to fractions, decimals and percentages in calculations
G2. Can determine term-to-term rules for sequences, use known facts to make deductions about numbers, shapes, angles
G3. Can represent problems and solutions using symbols and diagrams and share explanations and reasons for choices

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value			Number: Addition and Subtraction		Statistics		Number: Multiplication and Division		Measurement: Perimeter and Area		Consolidation
Spring	Number: Multiplication and Division			Number: Fractions						Number: Decimals and Percentages		Consolidation
Summer	Number: Decimals				Geometry: Properties of Shape			Geometry: Position and Direction	Measurement: Converting Units		Measurement: Volume	Consolidation

Essential Learning in Mathematics

Summary of Essential Learning in Year 6
• Identify the place value of the digits in large whole numbers and decimal numbers; round numbers, estimate and approximate to check results; use algebra to represent numbers, evaluate simple formulae and expressions
• Recall immediately number facts and the multiplication tables to 12x12 and carry out accurately mental calculations involving all four operations with whole numbers, decimals, fractions, percentages
• Use formal written methods of calculation for all four operations; understand and apply order of operations when calculating
• Express proportions and relationships between numbers and quantities as a fraction, percentage or ratio; construct, convert between and use equivalents
• Measure and draw accurately, convert units to take account of the context and required precision; take and compare reading on different scales; transform shapes and identify conserved properties; calculate missing angles
• Organise and analyse data in frequency tables; interpret and construct pie charts and line graphs that relate two variables; describe trends and relationships

Problem Solving, Reasoning, Communicating

- Pupils solve multi-step, routine and non-routine problems that involve the four operations. They use estimation to get a sense of the scale of the answer and round answers to a specified degree of accuracy. Pupils express and calculate quantities in given ratios, and use fractions, decimals and percentages to describe and calculate proportions and parts of quantities. They scale equal and unequal quantities up or down and use this to convert between units of measure. Pupils use letters to represent variables, an unknown value and to express relationships in number patterns or between two variables. They evaluate formulae and use them to find areas and volumes.
- Pupils reason mathematically. They use known properties of geometric shapes and numbers to sort and classify them and to calculate missing values. They identify the similarities or differences within a set of numbers and shapes, using what they know to deduce related properties. Pupils analyse and interpret information in tables, diagrams and pictures to determine what is important and use this to solve problems and logic puzzles. They use collected data and measurements to determine patterns and relationships and to provide answers to questions along with a justification for their choices and decisions. They infer trends and changes in data over time and use these to predict future results.
- Pupils use precise mathematical language to describe their thinking and observations. They interpret quantities and apply solutions to the context of a problem to ensure it is sensible. Pupils describe sequences and proportional parts and explain the difference between an approximate answer expressed as a decimal and an exact answer given as a fraction.

Language and Mathematics

The ***National Curriculum*** (Section 6: September 2013 Reference DFE-00180-2013) declares that:
"Teachers should develop pupils' spoken language, reading, writing and vocabulary as integral aspects of the teaching of every subject. Pupils should be taught to speak clearly and convey ideas confidently ... They should learn to justify ideas with reasons; ask questions to check understanding; develop vocabulary and build knowledge; negotiate; evaluate and build on the ideas of others ...They should be taught to give well-structured descriptions and explanations and develop their understanding through speculating, hypothesising and exploring ideas. This will enable them to clarify their thinking as well as organise their ideas ... Teachers should develop pupils' reading and writing in all subjects to support their acquisition of knowledge ... with accurate spelling and punctuation."

When we think mathematically we may use pictures, diagrams, symbols and words. We communicate our ideas, reasons, solutions and strategies to others using the spoken and written word. We listen to how others speak mathematics and read what they have written so we can interpret their ideas and solutions. Language is a fundamental tool of learning and this is as true for learning mathematics as it is for any other subject.
Having a good command of the spoken language of mathematics is an essential part of learning, and for developing confidence in mathematics. Children who say little are usually those who are fearful about saying the wrong thing, or giving an incorrect answer. Very often the quite children are those who lack the necessary vocabulary to express their ideas and thoughts to themselves and consequently to others.
Mathematics has its own vocabulary which children need to acquire and use. They need to be taught how to pronounce, write and spell the mathematical words they are to use and know when they apply and to what they apply. Learning the mathematics vocabulary and language of mathematics involves:

- associating objects, measures and events with their names (e.g. a cube, a mixed number, a metre rule, 2016 will be a leap year)
- stating, repeating and recalling facts aloud, and explaining how they can be used and applied (e.g. a regular quadrilateral is a square, three multiplied by four is twelve so twelve divided by four is three, seven tenths can be written as zero point seven)
- describing the relationship between two or more objects, shapes, events or sets (e.g. a diagonal cuts a rectangle into two identical triangles, the number fifty is double twenty-five, these four lines are all shorter than 15 centimetres, in 20 minutes time it will be 14:35)
- identifying properties and describing them (e.g. squares have four right-angled corners, negative numbers are less than zero, unit fractions have numerator one)
- framing an explanation, reasoning and making deductions (e.g. this triangle cannot be isosceles because its angles are unequal, 3 is a factor of 39 so 39 is not prime but 37 is a prime, if one quarter is £5 then the whole amount is 4 x £5 = £20)

Learning the Language of Mathematics

Learning to use the language of mathematics requires carefully prepared opportunity and continued experience and practice. When planning consider when and how your children will be taught to:

See the words – Hear them – Say them – Use and apply them – Spell them – Record them

It is important that children memorise and manipulate the language of mathematics. When planning consider when and how your children will learn to:

Visualise and manipulate mathematical pictures, diagrams, symbols or words in their heads

Key Mathematical Vocabulary: Year 6	
Number	Number system, powers of ten, place value, units, tens, hundreds, thousands, millions, billions; seven-digit number; decimal point, decimal places, tenths, hundredths, thousandths; round to required degree of accuracy, rounded; estimate, approximate value, is approximately equal to (≈), not equal to (≠); greater than (>), greater than or equal to (≥), less than (<), less than or equal to (≤), negative number; common factor, common multiple; prime number, factors, prime factor, square, cube,
Calculation	Sum, total, difference, difference between, addition, subtraction; long multiplication, short multiplication; product, scale up, multiple of, multiplier, multiplicand; factor pairs, factor of; long division, short division; quotient, scale up, scale down, divisor of, dividend, remainder; operation, inverse operations, order of operations, mixed operations, priority, brackets, power, index, exponent; commutative operation, associative rule, distributive law, max, min, maximum, minimum
Fractions	Whole number, mixed number, unit fraction, proper fraction, improper fraction; equal part, numerator, denominator, common denominator; convert to, simplify, cancel, reduce to, simplest form; equivalent fractions; decimal fraction, three decimal places; per cent, percentage (%); equivalent parts, equivalent numbers, equivalents; fraction as number, fraction as operator
Ratio and proportion	Equal sharing, unequal sharing; one-to-one; two-to-one; one-to-two; relative size; in the ratio; 4:1, four ... for every one ..., 2:3, two ... to every three ...; in the proportion, in proportion to; one ... in every four ... , one quarter of; scale up, scale down, scale factor, scale drawing, similar shapes; size, absolute value, absolute size, relative sizes
Algebra	Symbol, symbolism, notation; general case, generalisation; variable, particular value; arithmetic expression, algebraic expression, term; equivalent expressions; substitute, evaluate an expression, enumerate; variable, combinations of variables; dependent variable, independent variable, formulae; linear sequence, term-to-term rule; equal to, equation, unknown, solution, unique solution, values that satisfy an equation
Measurement	Units of measure, standard units, metric units, imperial units; metre, centimetre, millimetre, kilometre; miles, yards, feet; litre, centilitre, millilitre; gallon, pint; gram, centigram, milligram, kilogram; pound, stone; area, square, square units, m^2, cm^2, mm^2, km^2; volume, cube, cubic units, m^3, cm^3, mm^3, km^3; degrees Centigrade (ºC), degrees Fahrenheit (ºF), positive temperature, freezing point, negative temperature, below zero; analogue clock, digital clock, 12-hour time, 24-hour time; year, month, day, hour, minute, second; compound units, rates of change, speed, miles per hour, litres per minute, cost per second
Geometry	Dimension, 2-D, 3-D, plane, point, straight line, plane shape, side, corner, angle; right-angled, acute, obtuse, reflex; isosceles, equilateral, scalene, triangle, quadrilaterals, polygon, irregular/regular polygons; tessellation, tessellating shapes; circle, centre, radius, diameter, circumference; perpendicular lines, parallel lines; vertically opposite angles, angles on a line, angles about a point; coordinates, quadrants, axis, axes, vertex, vertices; transform, translate shapes, reflect shapes, line of reflection, mirror line, axis of symmetry; rotate, clockwise, anticlockwise, centre of rotation; cubes, cuboids, pyramids, prisms, polyhedron, polyhedral, nets; edge, vertex, face, side of faces
Statistics	Pie chart, sector, size, relative size, proportion, part relative to whole; count, frequency, discrete variable; measure, continuous variable; time graph, changes over time, trends; scatter plot, scatter graph, relationship; line graph, graphical representation, conversion, conversion graph, equivalent values; axes, scale, interval, approximately; average, average value, equal share, mean, middle value, median, most popular value mode; representative value; spread, range, distribution of value, symmetric, skewed
Problem solving, Reasoning, Communicating	Routine problem, non-routine problem; strategy, representation, picture, diagram, sketch; trial and improvement, systematic; analyse, interpret, construct, convince; collect, organise, order, sort data; identify patterns, establish relationships; if ... then ... ; because; does not apply, is not, as ... is then so is ... , ... is the same as ... , is a scale model of, scale drawing of, scaled up, scaled down; similar to, identical to, congruent to; is different to; conjecture, hypothesise, hypothesis; test, demonstrate, justify, prove, find counter-example; deduce from evidence, deduce results from general properties, deduction, apply general case to particular cases; generalise, generalisation, general case, induce, infer; one-step problem, multi-step problem; represent problem as picture, identify calculations; evaluate outcomes, check results, approximate answer

End-of-Year Learning Objectives for Year 6
A1. Can identify the value of the digits in any whole number and decimal numbers with up to three decimal places
A2. Can round whole and decimal numbers to a required degree of accuracy
A3. Can read negative numbers on scales and work out intervals, including those that cross zero
A4. Can use symbols and letters to represent numbers and relationships in formulae, equations, missing number problems
B1. Can recall and use number facts and 12 x 12 tables to calculate mentally, identify common factors and multiples
B2. Can use formal written methods to add and subtract whole and decimal numbers
B3. Can multiply and divide whole and decimal numbers by multiples of 10,100,1000 and by 1- and 2-digit whole numbers
B4. Can use formal written methods to multiply and divide numbers with up to 4 digits by 1- and 2-digit whole numbers
B5. Can represent division as a fraction, express remainders after division as fractions, in decimal form, or round appropriately
B6. Can apply the rules of arithmetic to evaluate expressions including the use of brackets
C1. Can simplify fractions using common factors, re-write fractions as equivalent fractions
C2. Can compare and order proper, improper and mixed fractions
C3. Can add and subtract fractions by converting to equivalent fractions, multiply pairs of proper fractions
C4. Can multiply simple proper fractions, divide a fraction by a whole number, find a fraction and a percentage of a quantity
C5. Can calculate the whole of a quantity given the value of a fractional or percentage part
C5. Can convert between simple fractions, decimals and percentages and use to calculate proportions
C6. Can interpret and use a ratio or scale factor to increase or decrease quantities
D1. Can measure accurately, read and convert between the common standard metric units of measure using decimal notation
D2. Can read and convert units of time, give approximate conversions between metric and Imperial units of measure
D3. Can calculate perimeters and areas of 2-D shapes and the volumes of cubes and cuboids using cubic units
A. Geometry – properties of shapes, position and direction
E1. Can draw 2-D shapes accurately and find missing angles in triangles, quadrilaterals and regular polygons
E2. Can interpret diagrams of 3-D shapes, build simple 3-D shapes and draw their nets accurately
E3. Can draw and name the parts of a circle, identify and calculate angles between straight lines and about a point
E4. Can plot points and interpret coordinates in all four quadrants; draw, complete, reflect and translate shapes
F1. Can interpret information presented graphically and construct pie charts, line and scatter graphs that relate two variables
F2. Can calculate the mean and interpret its use as a representative value for a data set
G1. Can solve multi-step problems that involve conversion of units, fractions, ratio, scaling; give answers to required accuracy
G2. Can use known facts to derive properties of number and shape, justify choice of operations when solving problems
G3. Can interpret numbers, shapes, patterns, graphs; use precise mathematical language to explain properties, methods, ideas

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value		Number: Addition, Subtraction, Multiplication and Division				Number: Fractions				Geometry: Position and Direction	Consolidation
Spring	Number: Decimals		Number: Percentages		Number: Algebra		Measurement: Converting Units	Measurement: Perimeter, Area and Volume		Number: Ratio		Consolidation
Summer	Geometry: Properties of Shape		Problem Solving			Statistics		Investigations				Consolidation

Multiplication and division facts (year 1- 6)

By the end of Year 1	By the end of Year 2	By the end of Year 3	By the end of Year 4	By the end of Year 5	By the end of Year 6
Count in multiples of 1s,2s,5s and 10s.	2, 5, 10 including division facts	As Year 2 plus 3, 4,6, 8, including division facts	All times tables up to 12 x 12 with division facts. Times tables testing will be introduced for Year 4s from 2019 /20.	As year 4 and Identify multiples and factors including factor pairs and common factors Recall prime numbers to 19 Identify prime numbers and prime factors to 100 Recognise and use square and cube numbers	As Year 5 and Identify common factors, common multiples, prime numbers up to 100

MathsHUBS London South East

National Centre for Excellence in the Teaching of Mathematics

Number: Number and Place Value

National Centre for Excellence in the Teaching of Mathematics

COUNTING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number			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	use negative numbers in context, and calculate intervals across zero
count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	count from 0 in multiples of 4, 8, 50 and 100;	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 1000 000	
given a number, identify one more and one less		find 10 or 100 more or less than a given number	find 1000 more or less than a given number		
COMPARING NUMBERS					
use the language of: equal to, more than, less than (fewer), most, least	compare and order numbers from 0 up to 100; use <, > and = signs	compare and order numbers up to 1000	order and compare numbers beyond 1000 *compare numbers with the same number of decimal places up to two decimal places* (copied from Fractions)	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)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)
IDENTIFYING, REPRESENTING AND ESTIMATING NUMBERS					
identify and represent numbers using objects and pictorial representations including the number line	identify, represent and estimate numbers using different representations, including the number line	identify, represent and estimate numbers using different representations	identify, represent and estimate numbers using different representations		

Number: Number and Place Value

National Centre for Excellence in the Teaching of Mathematics

READING AND WRITING NUMBERS (including Roman Numerals)					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
read and write numbers from 1 to 20 in numerals and words.	read and write numbers to at least 100 in numerals and in words	read and write numbers up to 1000 in numerals and in words	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, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Understanding Place Value)
		tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks (copied from Measurement)		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 two-digit number (tens, ones)	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	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)	read, write, order and compare numbers up to 10 000 000 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)	*identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places* (copied from Fractions)

Number: Number and Place Value

National Centre for Excellence in the Teaching of Mathematics

ROUNDING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			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 any whole number to a required degree of accuracy
			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)	*solve problems which require answers to be rounded to specified degrees of accuracy* (copied from Fractions)
PROBLEM SOLVING					
	use place value and number facts to solve problems	solve number problems and practical problems involving these ideas.	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	solve number and practical problems that involve all of the above

Number: Number and Place Value

National Centre for Excellence in the Teaching of Mathematics

COUNTING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number			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	use negative numbers in context, and calculate intervals across zero
count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	count from 0 in multiples of 4, 8, 50 and 100;	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 1000 000	
given a number, identify one more and one less		find 10 or 100 more or less than a given number	find 1000 more or less than a given number		
COMPARING NUMBERS					
use the language of: equal to, more than, less than (fewer), most, least	compare and order numbers from 0 up to 100; use <, > and = signs	compare and order numbers up to 1000	order and compare numbers beyond 1000 *compare numbers with the same number of decimal places up to two decimal places* (copied from Fractions)	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)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)
IDENTIFYING, REPRESENTING AND ESTIMATING NUMBERS					
identify and represent numbers using objects and pictorial representations including the number line	identify, represent and estimate numbers using different representations, including the number line	identify, represent and estimate numbers using different representations	identify, represent and estimate numbers using different representations		

Number: Number and Place Value

National Centre for Excellence in the Teaching of Mathematics

READING AND WRITING NUMBERS (including Roman Numerals)					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
read and write numbers from 1 to 20 in numerals and words.	read and write numbers to at least 100 in numerals and in words	read and write numbers up to 1000 in numerals and in words	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, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Understanding Place Value)
		tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks (copied from Measurement)		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 two-digit number (tens, ones)	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	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)	read, write, order and compare numbers up to 10 000 000 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)	*identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places* (copied from Fractions)

Number: Number and Place Value

National Centre for Excellence in the Teaching of Mathematics

ROUNDING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			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 any whole number to a required degree of accuracy
			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)	*solve problems which require answers to be rounded to specified degrees of accuracy* (copied from Fractions)
PROBLEM SOLVING					
	use place value and number facts to solve problems	solve number problems and practical problems involving these ideas.	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	solve number and practical problems that involve all of the above

Number: Addition and Subtraction

National Centre for Excellence in the Teaching of Mathematics

NUMBER BONDS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
represent and use number bonds and related subtraction facts within 20	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100				
MENTAL CALCULATION					
add and subtract one-digit and two-digit numbers to 20, including zero	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	add and subtract numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds		add and subtract numbers mentally with increasingly large numbers	perform mental calculations, including with mixed operations and large numbers
read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods)	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot				use their knowledge of the order of operations to carry out calculations involving the four operations

Number: Addition and Subtraction

National Centre for Excellence in the Teaching of Mathematics

WRITTEN METHODS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Mental Calculation)		add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	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, ESTIMATING AND CHECKING ANSWERS					
	recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	estimate the answer to a calculation and use inverse operations to check 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	use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Number: Addition and Subtraction

National Centre for Excellence in the Teaching of Mathematics

PROBLEM SOLVING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ - 9	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	solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	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	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
	solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from Measurement)				Solve problems involving addition, subtraction, multiplication and division

Number: Multiplication and Division

National Centre for Excellence in the Teaching of Mathematics

MULTIPLICATION & DIVISION FACTS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
count in multiples of twos, fives and tens (copied from Number and Place Value)	*count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward* (copied from Number and Place Value)	*count from 0 in multiples of 4, 8, 50 and 100* (copied from Number and Place Value)	*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 and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	recall multiplication and division facts for multiplication tables up to 12 × 12		
MENTAL CALCULATION					
		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 (appears also in Written Methods)	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	perform mental calculations, including with mixed operations and large numbers
	show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot		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	*associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^{3}/_{8}$)* (copied from Fractions)

Number: Multiplication and Division

National Centre for Excellence in the Teaching of Mathematics

WRITTEN CALCULATION					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	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 (appears also in Mental Methods)	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	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 one-digit number using the formal written method of short division and interpret remainders appropriately for the context	divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate for the context divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
					use written division methods in cases where the answer has up to two decimal places (copied from Fractions (including decimals))

Number: Multiplication and Division

National Centre for Excellence in the Teaching of Mathematics

PROPERTIES OF NUMBERS: MULTIPLES, FACTORS, PRIMES, SQUARE AND CUBE NUMBERS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			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.	identify common factors, common multiples and prime numbers *use common factors to simplify fractions; use common multiples to express fractions in the same denomination* (copied from Fractions)
				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})	*calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3* (copied from Measures)

Number: Multiplication and Division

National Centre for Excellence in the Teaching of Mathematics

ORDER OF OPERATIONS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					use their knowledge of the order of operations to carry out calculations involving the four operations
INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS					
		estimate the answer to a calculation and use inverse operations to check answers (copied from Addition and Subtraction)	*estimate and use inverse operations to check answers to a calculation* (copied from Addition and Subtraction)		use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

Number: Multiplication and Division

National Centre for Excellence in the Teaching of Mathematics

PROBLEM SOLVING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
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	solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects	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
				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	*solve problems involving similar shapes where the scale factor is known or can be found* (copied from Ratio and Proportion)

Number: Fractions (including Decimals and Percentages)

National Centre for Excellence in the Teaching of Mathematics

COUNTING IN FRACTIONAL STEPS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Pupils should count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line (Non Statutory Guidance)	count up and down in tenths	count up and down in hundredths		
RECOGNISING FRACTIONS					
recognise, find and name a half as one of two equal parts of an object, shape or quantity	recognise, find, name and write fractions $^{1}/_{3}$, $^{1}/_{4}$, $^{2}/_{4}$ and $^{3}/_{4}$ of a length, shape, set of objects or quantity	recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators	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)	
		recognise that tenths arise from dividing an object into 10 equal parts and in dividing one – digit numbers or quantities by 10.			
recognise, find and name a quarter as one of four equal parts of an object, shape or quantity		recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators			
COMPARING FRACTIONS					
		compare and order unit fractions, and fractions with the same denominators		compare and order fractions whose denominators are all multiples of the same number	compare and order fractions, including fractions >1

Number: Fractions (including Decimals and Percentages)

National Centre for Excellence in the Teaching of Mathematics

COMPARING DECIMALS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			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	identify the value of each digit in numbers given 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	solve problems which require answers to be rounded to specified degrees of accuracy
EQUIVALENCE (INCLUDING FRACTIONS, DECIMALS AND PERCENTAGES)					
	write simple fractions e.g. $^{1}/_{2}$ of 6 = 3 and recognise the equivalence of $^{2}/_{4}$ and $^{1}/_{2}$.	recognise and show, using diagrams, equivalent fractions with small denominators	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	use common factors to simplify fractions; use common multiples to express fractions in the same denomination
			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	associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^{3}/_{8}$)
			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	recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Number: Fractions (including Decimals and Percentages)

National Centre for Excellence in the Teaching of Mathematics

ADDITION AND SUBTRACTION OF FRACTIONS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		add and subtract fractions with the same denominator within one whole (e.g. $^{5}/_{7} + {}^{1}/_{7} = {}^{6}/_{7}$)	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. $^{2}/_{5} + {}^{4}/_{5} = {}^{6}/_{5} = 1\,{}^{1}/_{5}$)	add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
MULTIPLICATION AND DIVISION OF FRACTIONS					
				multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $^{1}/_{4} \times {}^{1}/_{2} = {}^{1}/_{8}$) multiply one-digit numbers with up to two decimal places by whole numbers
					divide proper fractions by whole numbers (e.g. $^{1}/_{3} \div 2 = {}^{1}/_{6}$)

Number: Fractions (including Decimals and Percentages)

National Centre for Excellence in the Teaching of Mathematics

MULTIPLICATION AND DIVISION OF DECIMALS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					multiply one-digit numbers with up to two decimal places by whole 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 ones, tenths and hundredths		multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
					identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
					associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^{3}/_{8}$)
					use written division methods in cases where the answer has up to two decimal places

Number: Fractions (including Decimals and Percentages)

National Centre for Excellence in the Teaching of Mathematics

PROBLEM SOLVING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		solve problems that involve all of the above	solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number	solve problems involving numbers up to three decimal places	
			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.	

Ratio and Proportion

National Centre for Excellence in the Teaching of Mathematics

Statements only appear in Year 6 but should be connected to previous learning, particularly fractions and multiplication and division					
					Year 6
					solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
					solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
					solve problems involving similar shapes where the scale factor is known or can be found
					solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

Algebra

National Centre for Excellence in the Teaching of Mathematics

EQUATIONS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and ***missing number problems*** *such as 7 = □ - 9* (copied from Addition and Subtraction)	*recognise and use the inverse relationship between addition and subtraction and use this to check calculations and* ***missing number*** *problems.* (copied from Addition and Subtraction)	solve problems, *including* ***missing number*** *problems, using number facts, place value, and more complex addition and subtraction.* (copied from Addition and Subtraction) *solve problems, including* ***missing number*** *problems, involving multiplication and division, including integer scaling* (copied from Multiplication and Division)		*use the properties of rectangles to deduce related facts and find* ***missing lengths and angles*** (copied from Geometry: Properties of Shapes)	express missing number problems algebraically
	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (copied from Addition and Subtraction)				find pairs of numbers that satisfy number sentences involving two unknowns
represent and use number bonds and related subtraction facts within 20 (copied from Addition and Subtraction)					enumerate all possibilities of combinations of two variables

Algebra

National Centre for Excellence in the Teaching of Mathematics

FORMULAE					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit. (Copied from NSG measurement)		use simple formulae *recognise when it is possible to use **formulae** for area and volume of shapes* (copied from Measurement)
SEQUENCES					
sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening (copied from Measurement)	*compare and sequence intervals of time* (copied from Measurement) *order and arrange combinations of mathematical objects in patterns* (copied from Geometry: position and direction)				generate and describe linear number sequences

Measurement

National Centre for Excellence in the Teaching of Mathematics

COMPARING AND ESTIMATING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
compare, describe and solve practical problems for: * lengths and heights [e.g. long/short, longer/shorter, tall/short, double/half] * mass/weight [e.g. heavy/light, heavier than, lighter than] * capacity and volume [e.g. full/empty, more than, less than, half, half full, quarter] * time [e.g. quicker, slower, earlier, later]	compare and order lengths, mass, volume/capacity and record the results using >, < and =		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)	calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3.
sequence events in chronological order using language [e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]	compare and sequence intervals of time	compare durations of events, for example to calculate the time taken by particular events or tasks			
		estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight (appears also in Telling the Time)			

Measurement

National Centre for Excellence in the Teaching of Mathematics

MEASURING and CALCULATING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
measure and begin to record the following: * **lengths and heights** * **mass/weight** * **capacity and volume** * **time** (hours, minutes, seconds**)**	choose and use appropriate standard units to estimate and measure **length/height** in any direction (m/cm); **mass** (kg/g); **temperature** (°C); **capacity** (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels	measure, compare, add and subtract: **lengths** (m/cm/mm); **mass** (kg/g); **volume/capacity** (l/ml)	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.	solve problems involving the calculation and conversion of **units of measure**, using decimal notation up to three decimal places where appropriate (appears also in Converting)
		measure the **perimeter** of simple 2-D shapes	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	recognise that shapes with the same areas can have different **perimeters** and vice versa

Measurement

National Centre for Excellence in the Teaching of Mathematics

MEASURING and CALCULATING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
recognise and know the value of different denominations of **coins and notes**	recognise and use symbols for pounds **(£) and pence (p)**; combine amounts to make a particular value	add and subtract amounts of **money** to give change, using both £ and p in practical contexts			
	find different combinations of coins that equal the same amounts of money				
	solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change				
			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)	calculate the area of parallelograms and triangles
					calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [e.g. mm^3 and km^3].
					recognise when it is possible to use formulae for area and volume of shapes

Measurement

National Centre for Excellence in the Teaching of Mathematics

TELLING THE TIME					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.	tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks	read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting)		
recognise and use language relating to dates, including days of the week, weeks, months and years	know the number of minutes in an hour and the number of hours in a day. (appears also in Converting)	estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight (appears also in Comparing and Estimating)			
			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	

Measurement

National Centre for Excellence in the Teaching of Mathematics

CONVERTING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	know the number of minutes in an hour and the number of hours in a day. (appears also in Telling the Time)	know the number of seconds in a minute and the number of days in each month, year and leap year	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)	use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
			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 the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate (appears also in Measuring and Calculating)
			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	convert between miles and kilometres

Geometry: Properties of Shapes

National Centre for Excellence in the Teaching of Mathematics

IDENTIFYING SHAPES AND THIER PROPERTIES					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
recognise and name common 2-D and 3-D shapes, including: * 2-D shapes [e.g. rectangles (including squares), circles and triangles] * 3-D shapes [e.g. cuboids (including cubes), pyramids and spheres].	identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line		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	recognise, describe and build simple 3-D shapes, including making nets (appears also in Drawing and Constructing)
	identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces				illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
	identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]				
DRAWING AND CONSTRUCTING					
		draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them	complete a simple symmetric figure with respect to a specific line of symmetry	draw given angles, and measure them in degrees (^{o})	draw 2-D shapes using given dimensions and angles
					recognise, describe and build simple 3-D shapes, including making nets (appears also in Identifying Shapes and Their Properties)

Geometry: Properties of Shapes

National Centre for Excellence in the Teaching of Mathematics

COMPARING AND CLASSIFYING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	compare and sort common 2-D and 3-D shapes and everyday objects		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	compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
ANGLES					
		recognise angles as a property of shape or a description of a turn		know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles	
		identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle	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°	recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
		identify horizontal and vertical lines and pairs of perpendicular and parallel lines			

Geometry: Position and Direction

National Centre for Excellence in the Teaching of Mathematics

POSITION, DIRECTION AND MOVEMENT					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
describe position, direction and movement, including half, quarter and three-quarter turns.	use mathematical vocabulary to describe position, direction and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)		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 positions on the full coordinate grid (all four quadrants)
			describe movements between positions as translations of a given unit to the left/right and up/down		draw and translate simple shapes on the coordinate plane, and reflect them in the axes.
			plot specified points and draw sides to complete a given polygon		
PATTERN					
	order and arrange combinations of mathematical objects in patterns and sequences				

Statistics

National Centre for Excellence in the Teaching of Mathematics

INTERPRETING, CONSTRUCTING AND PRESENTING DATA					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	interpret and construct simple pictograms, tally charts, block diagrams and simple tables	interpret and present data using bar charts, pictograms and tables	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	interpret and construct pie charts and line graphs and use these to solve problems
	ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity				
	ask and answer questions about totalling and comparing categorical data				
SOLVING PROBLEMS					
		solve one-step and two-step questions [e.g. 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.	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	calculate and interpret the mean as an average