



# The St Mary's Primary Maths Curriculum

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## The St Mary's Primary Mathematics Curriculum

### INTENT

#### WHY do we teach Mathematics at St Mary's?

*"Pure Mathematics is, in its way, the poetry of logical ideas." – Albert Einstein*

***Believe + Enjoy + Achieve = Everything Is Possible***

Mathematics is an important creative discipline that helps us to understand and change the world. We want all pupils at St Mary's Broughton Gifford to experience the beauty, power and enjoyment of mathematics and develop a sense of curiosity about the subject.

At St Mary's, we foster positive 'can do' attitudes, actively believe *all* children can achieve in mathematics, and teach for secure and deep understanding of mathematical concepts. We use mistakes and misconceptions as an essential part of learning and provide challenge through rich and sophisticated problems before acceleration through new content.

#### **It is our intent that by the time a child leaves St Mary's they will have...**

- Become **fluent in the fundamentals of mathematics** (see Breadth of Study progression) so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **Solve problems** by applying their mathematics to a variety of problems with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios
- **Reason mathematically** by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.
- Have an **appreciation of number and number operations**, which enables mental calculations and written procedures to be performed efficiently, fluently and accurately to be successful in mathematics.
- **Secure and deep understanding** of Mathematical concepts

The essential idea behind teaching of Maths at St Mary's Broughton Gifford is that all children need a secure and deep understanding of the mathematical concepts they are learning so that:

- Future mathematical learning is **built on solid foundations**, which do not need to be re-taught;
- There is **no need for separate catch-up programmes** due to some children falling behind;
- Children who, under other teaching approaches, can often fall a long way behind, are better able to keep up with their peers, so that **gaps in attainment are narrowed while the attainment of all is raised.**

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At St Mary's Broughton Gifford, we view this as a set of core principles and beliefs. This includes a belief that all pupils are capable of understanding and doing mathematics, given sufficient time. Pupils are neither 'born with the maths gene' nor 'just no good at maths'. With good teaching, appropriate resources, effort and a 'can do' attitude all children can achieve in and enjoy mathematics. Integral to **mastery** of the curriculum is the development of deep rather than superficial conceptual understanding. The research for the review of the National Curriculum showed that it should focus on "fewer things in greater depth", in secure learning which persists, rather than relentless, over-rapid progression.

We feel **secure and deep understanding of the mathematics curriculum** requires that all pupils:

- *Use mathematical concepts, facts and procedures appropriately, flexibly and fluently;*
- *Recall key number facts with speed and accuracy and use them to calculate and work out unknown facts;*
- *Have sufficient depth of knowledge and understanding to reason and explain mathematical concepts and procedures and use them to solve a variety of problems.*

To support this, we believe **that if a pupil has mastered a mathematical concept**, idea or technique he or she can:

- *Describe it in his or her own words;*
- *Represent it in a variety of ways (e.g. using concrete materials, pictures and symbols)*
- *Explain it to someone else;*
- *Make up his or her own examples (and no examples) of it;*
- *See connections between it and other facts or ideas;*
- *Recognise it in new situations and contexts;*
- *Make use of it in various ways, including in new situations.*

### Implementation

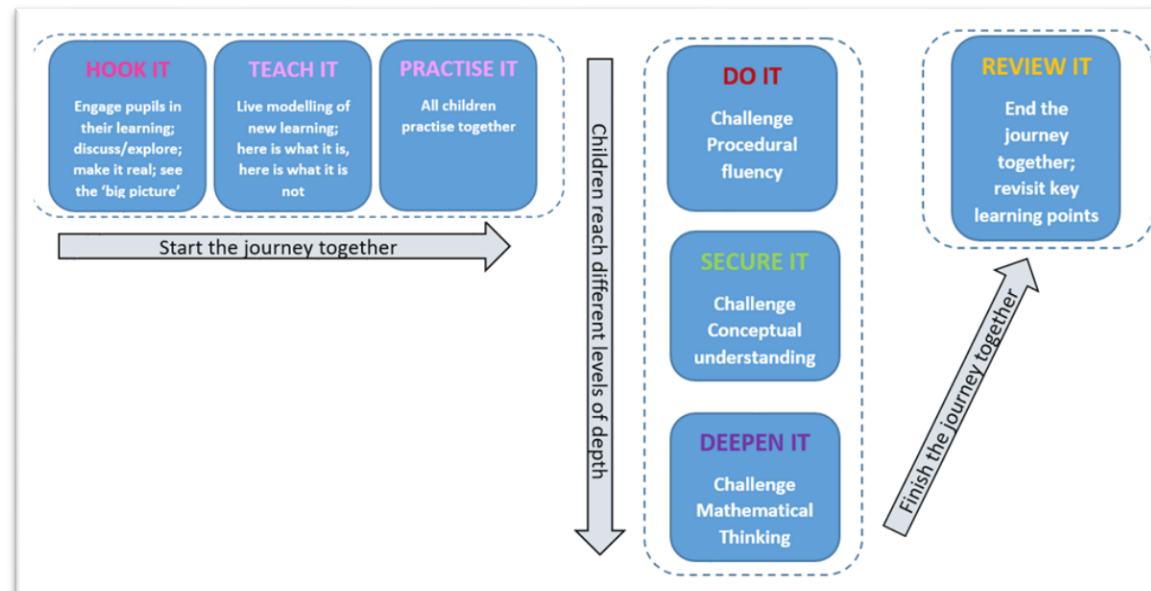
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### HOW do we teach Mathematics at St Mary's?

#### 1) Mathematics Lesson: Intelligent Practice

Each day, classes take part in **Maths Lessons** (40-45mins) which focus on one manageable step, taken from a thorough and well-considered long and medium term planning document, which ensures sufficient, progressive and deep coverage of all curriculum objectives. Unit planning is based on the National Curriculum Statements ('Themes') dividing materials into manageable steps lesson by lesson.

#### Typical Maths Lesson Design:



Whilst this is the 'typical' lesson design, we also recognise the need for flexibility in planning to allow teachers to approach different concepts in different ways according to the complexity of the subject and age of the children. Here are some examples of how it may be adapted:

- Rather than a lesson including a Do It, Twist It, Solve It section, these may be tackled over several lessons to allow for more time to be given to each section. For example, a class might have a Do It Day, a Twist It Day and a Solve It Day

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- Whilst transitioning from Foundation Stage to Year 1 in the Autumn terms, teaching of Mathematics takes on a less formal lesson design, focusing on using manipulatives, learning through exploration and play and discussion-based learning, with evidence coming as part of teachers' observations, photo evidence and other recordings, transitioning towards more formal recordings in books in the Spring term. However, the language of Do It, Twist It and Solve It will be introduced and used from the beginning of Year 1 alongside this approach.

### 2) Maths Meetings: Deliberate Practice

At St Mary's Broughton Gifford, we make time every day for children to take part in Maths Meetings (20 minutes). This is specifically timetabled beyond the Maths Lessons to support deliberate practice, consolidation, pre-teach and/or provide immediate intervention. This time to revisit previously learned concepts, knowledge and procedures ensures that, once learned, mathematical knowledge becomes deeply embedded in pupils' memories.

#### **Example Weekly Overview:**

- *Monday: Arithmetic Practice (past and present skills)*
- *Tuesday: Arithmetic Practice (past and present skills)*
- *Wednesday: Deliberate Practice and/or Same Day/Week 'Preventing the Gap' Intervention*
- *Thursday: Deliberate Practice and/or Same Day/Week 'Preventing the Gap' Intervention*
- *Friday: Fact Friday (Y1 Bonds; Y2 Multiplication and Division Facts 2, 5, 10; KS2 Multiplication and Division Facts)*

However, teachers are encouraged to routinely adapt these sessions based on the arising needs of the children in their class, using both their formative and summative assessments to help inform this. For example, there may have been gaps in children's learning from previous weeks we need further practise as gleaned from an end of term assessment, or a teacher may have identified a gap in children's understanding at the beginning of the week which needs to be addressed immediately. As with the Maths Lessons, there is flexibility for teachers to adapt the order and timetabling of Maths Meetings to suit the arising needs, age of the children and other timetabling adaptationso: sme classes may have their Maths Meetings prior to a Maths Lesson, some may have them immediately after lunch and some may have them at the beginning of the school day.

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### Higher Attaining Pupils

At St Mary's Broughton Gifford, developing secure and deep understanding of all mathematical concepts is used to acknowledge that all pupils require depth in their learning, but some pupils will go deeper still in their learning and understanding. However, our 'can do' approach to teaching Maths means that we do not label pupils as lower/higher ability, as the use of this language puts an automatic ceiling on what children can or cannot achieve as predetermined by their teachers, parents or themselves. In fact, research shows that when teachers teach with the belief that a pupil is capable of achieving well, those children go on to make more rapid progress than their peers (*Pygmalion in the Classroom*, Rosenthal and Jacobsen, 1968). As such, we use the language of 'prior lower/higher attaining' pupils and ensure that all children access all parts of Maths Lessons. Although we encourage challenge for all through all stages of teaching and learning, we ensure that children who attain well and grasp concepts quickly are given the opportunity to deepen their learning even further in every lesson.

It is inevitable that some pupils will grasp concepts more rapidly than others and will need to be stimulated and challenged to ensure continued progression. However, research indicates that these pupils benefit more from enrichment and deepening of content, rather than acceleration into new content. Acceleration is likely to promote superficial understanding, rather than the true depth and rigour of knowledge that is a foundation for higher mathematics.

**Challenge for all** is provided by *going deeper* rather than accelerating too early into new mathematical content; it is a fundamental element of our approach to Maths teaching, being woven throughout every part of a lesson for all children. During the Teach It/Practise It parts of lessons, teachers challenge all children to develop their procedural, conceptual and depth of understanding through questioning, using precise mathematical vocabulary and generalisations, and expecting all children to reason about their understanding using the same vocabulary/generalisations.

We believe if a child is developing **mastery with greater depth** the child can:

- *Solve problems of greater complexity (i.e. where the approach is not immediately obvious), demonstrating creativity and imagination;*
- *Independently explore and investigate mathematical contexts and structures, communicate results clearly and systematically explain and generalise the mathematics.*

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### Children with Special Educational Needs (SEN):

Typically, all children are taught maths as part of whole classes of children, as we believe that children benefit from exposure to mathematical discussion, demonstration and explanation of methods. Children with SEN are encouraged and supported to participate in daily maths lessons where appropriate. Where applicable, children will have individual targets which are recorded in their SEN provision maps. These targets are based on the child's level of development and are matched appropriately to the National Curriculum Programme of Study for Mathematics.

Children with SEN who are finding it difficult to access the content of main maths lessons may be supported by additional support staff who work in collaboration with the class teachers. Children with severe and complex learning needs may be supported through an individualised programme of support in the main part of a lesson, so that the content of lessons is matched to their level of ability. This may mean that these children are being taught knowledge, skills and understanding in ways that suit their individual needs. This could be presented as teaching them knowledge, skills and understanding from previous Year Groups or Key Stages so that they can make progress and achieve at a pace which is appropriate for them.

### Early Years Foundation Stage (EYFS):

Teachers and practitioners support children in developing their understanding of mathematics in a broad range of contexts in which they can explore, enjoy, learn, practise and talk about their developing understanding. This area of development includes seeking patterns, making connections, recognising relationships, working with numbers, shapes and measures, and counting, sorting and matching. Children use their knowledge and skills in these areas to solve problems, generate new questions and make connections across other areas of learning and development.

Children in the EYFS learn by playing and exploring, being active, and through creative and critical thinking which takes place both indoors and outside. We recognise that children learn through routine, continuous provision and incidental learning opportunities, as well as planned sessions and activities. Mathematical understanding can be developed through stories, songs, games, routine, questioning, imaginative play, child initiated learning and structured teaching.

In Foundation Stage 1, group activities are timetabled and planned. In Foundation Stage 2, daily time is dedicated to mathematics. Overall these lessons include a good balance between whole-class work, group teaching and individual practice. In the Autumn term, these

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sessions are similar to those in Foundation Stage 1. However, throughout the year there is a gradual shift where adult-directed sessions are extended in preparation for Year 1.

Overall, in Mathematics at St Mary's, we will be doing more of this:

- ☑ Teaching all pupils in class, together, most of the time
- ☑ Verbal feedback during lessons and more ticking of correct concepts
- ☑ Spending longer on one idea
- ☑ Giving pupils who need it additional support over shorter more intense timescales – ideally same/next day - to prevent gaps in learning occurring
- ☑ Regular assessments which cover what's been taught to inform teaching

And less of this:

- ☒ Formal marking with lots of feedback and 'next steps'
- ☒ Covering lots of ideas in one week
- ☒ Formal, long term interventions to boost pupils out of class
- ☒ Separating in to ability groups
- ☒ Formal testing of pupils termly to obtain a grade/level



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### Mixed-Age Classes

As a school with mixed-age classes, we recognise a need to balance full and deep coverage of the curriculum alongside the logistical and workload challenges of teaching two year group's curricula concurrently. As a result, there are the approaches staff will adopt in order to strike the most efficient balance for their cohorts of children when planning for mixed-aged classes:

- **Teaching separate sessions for each year group**
  - Teaching smaller, separate sessions to each year group. For example, teach one year for 30mins, then swap with the other
  - Focusing on one year group for a whole session while the other does Extra Problem Solving, practise of prior learning etc, supervised by a TA
- **Joining up similar concepts by rearranging the order and/or covering both objectives in one session**
  - Some objectives overlap and can be covered at the same time, developing depth of understanding for each year group through targeted questioning
  - Some objectives are the same for both year groups and can be taught concurrently
- **Being flexible with the length of time spent on concepts**
  - Through assessment information, teachers may use their professional judgement to decide that there are some concepts which your class have already mastered. As a result, they may not need as many sessions as the planning suggests and, therefore, can spend less time on that concept and more on another
  - The planning template allows flexibility for 'Extra Problem Solving' sessions, which can be used to focus on year group specific content while another focused on additional problem solving
  - Some concepts may only need light-touch coverage and could be built upon in the Maths Meetings
  - Some concepts can be drip-fed (e.g. days of the week, months, time, roman numerals etc) and may not need specific Maths Lesson time to
  - Some concepts can be covered in a cross-curricular way (e.g. statistics, averages, measures through Science)

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### WHAT do we teach in Mathematics at St Mary's?

The CanDoMaths approach is used to underpin teacher's teaching, planning and assessment of Mathematics. Can Do is underpinned by the National Curriculum and Non-Statutory Guidance and, as a result, CanDoMaths progression and sequencing of lessons can be monitored in-line with national expectations. EYFS use the Maths Project, developed by Sue Rayner, as their framework for teaching (***The CanDoMaths Manageable Steps for each year group and Maths Project overview can be found on the school website alongside this policy.***)

The Can DoMaths and Sue Rayner progressions are used as a **framework** from which teachers plan their sequence of lessons. However, teacher judgement will ultimately be used as the basis for deciding the sequence of lessons and amount of time spent on each concept depending on the arising needs of the children in each cohort.

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## Core Skills Progression

### Breadth of Study

count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number	count, read and write numbers to 100 in numerals; count in multiples of two, fives and tens	given a number, identify one more and one less	identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least	read and write numbers from 1 to 20 in numerals and words.	read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs	represent and use number bonds and related subtraction facts within 20
add and subtract one-digit and two-digit numbers to 20, including zero numbers	solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$	<b>Stage 1</b>		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.	recognise, find and name a half as 1 of 2 equal parts of an object, shape or quantity	
recognise, find and name a quarter as 1 of 4 equal parts of an object, shape or quantity	<b>Mathematics</b>		compare, describe and solve practical problems for: - lengths and heights [for example, long/short, longer/shorter, tall/short double/half] - mass/weight [for example, heavy/light, heavier than, lighter than] - capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] - time [for example, quicker, slower, earlier, later]			
measure and begin to record the following: - lengths and heights - mass/weight - capacity and volume - time (hours, minutes, seconds)	recognise and know the value of different denominations of coins and notes	sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]	recognise and use language relating to dates, including days of the week, weeks, months and years	tell the time to the hour and half past the hour and draw the hands on a clock face to show these times	recognise and name common 2-D and 3-D shapes, including: - 2-D shapes [for example rectangles (including squares), circles and triangles] - 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]	describe position, direction and movement, including whole, half, quarter and three-quarter turns

count in steps of 2, 5, and 5 from 0, and in tens from any number, forward and backward	recognise the place value of each digit in a two-digit number (tens, ones)	identify, represent and estimate numbers using different representations, including the number line	compare and order numbers from 0 up to 100; use <, > and = signs	read and write numbers to at least 100 in numerals and in words	use place value and number facts to solve problems	solve problems with addition and subtraction: - using concrete objects and pictorial representations, including those involving numbers, quantities and measures - applying their increasing knowledge of mental and written methods
recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	add and subtract concrete objects, pictorial representations, and mentally: - a two-digit number and ones - a two-digit number and tens - two two-digit numbers - adding three one-digit numbers	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot	recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	recognise, find, name and write fractions $1/3$ , $1/4$ , $2/4$ and $3/4$ of a length, shape, set of objects or quantity	<b>Stage 2</b>		<b>Mathematics</b>		write simple fractions for example, $1/2$ of 6 or 3 and recognise the equivalence of $2/4$ and $1/2$
Choose appropriate 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	recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value	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 and change	compare and sequence intervals of time	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	know the number of minutes in an hour and the number of hours in a day.
identify and describe the properties of 2-D shapes, including the number of edges, vertices and faces	identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]	compare and sort common 2-D and 3-D shapes and everyday objects	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)	interpret and construct simple pictograms, tally charts, block diagrams and simple tables	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

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count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	compare and order numbers up to 1000	identify, represent and estimate numbers using different representations	read and write numbers up to 1000 in numerals and in words	solve number problems and practical problems involving these ideas	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 with up to three digits, using formal written methods of columnar addition and subtraction	estimate the answer to a calculation and use inverse operations to check answers	solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	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	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	count up and down in tenths; 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 write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators	<h2>Stage 3 Mathematics</h2>					recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
recognise and show, using diagrams, equivalent fractions with small denominators						add and subtract fractions with the same denominator within one whole (for example, $5/7 + 1/7 = 6/7$ )
compare and order unit fractions, and fractions with the same denominators	measure, compare, add and subtract: lengths (m/cm/mm), mass (kg/g), volume/capacity (l/ml)	measure the perimeter of simple 2-D shapes	add and subtract amounts of money to give change, using both £ and p in practical contexts	tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks	estimate time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as 'o'clock', a.m./p.m., morning, afternoon, noon and midnight	know the number of seconds in a minute and the number of days in each month, year and leap year
compare durations of events (for example to calculate the time taken by particular events or tasks)	draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them	recognise angles as a property of shape or a description of a turn	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 horizontal and vertical lines and pairs of perpendicular and parallel lines	interpret and present data using bar charts, pictograms and tables	solve one-step and two-step questions (for example, 'How many more?' and 'How many fewer?') using information presented in scaled bar charts and pictograms and tables

count in multiples of 6, 7, 9, 25 and 1000	find 1000 more or less than a given number	count backwards through zero to include negative numbers	recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)	order and compare numbers beyond 1000	identify, represent and estimate numbers using different representations	round any number to the nearest 10, 100 or 1000	solve number and practical problems that involve all of the above and with increasingly large positive numbers	read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value	
add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	estimate and use inverse operations to check answers to a calculation	solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	recall multiplication and division facts for multiplication tables up to $12 \times 12$	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	recognise and use factor pairs and commutativity in mental calculations	multiply two-digit and three-digit numbers by a one-digit number using formal written layout	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	recognise and show, using diagrams, families of common equivalent fractions	
count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten	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	<h2>Stage 4 Mathematics</h2>					add and subtract fractions with the same denominator	recognise and write decimal equivalents of any number of tenths or hundredths	
recognise and write decimal equivalents to $1/4, 1/2, 3/4$	round decimals with one decimal place to the nearest whole number						compare numbers with the same number of decimal places	solve simple measure and money problems involving fractions and decimals to two decimal places.	Convert between different units of measure (for example, kilometre to metre; hour to minute)
compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	identify acute and obtuse angles and compare and order angles up to two right angles by size	identify lines of symmetry in 2-D shapes presented in different orientations	complete a simple symmetric figure with respect to a specific line of symmetry	describe positions on a 2-D grid as coordinates in the first quadrant	describe movements between positions as translations of a given unit to the left/right and up/down	plot specified points and draw sides to complete a given polygon	interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs	

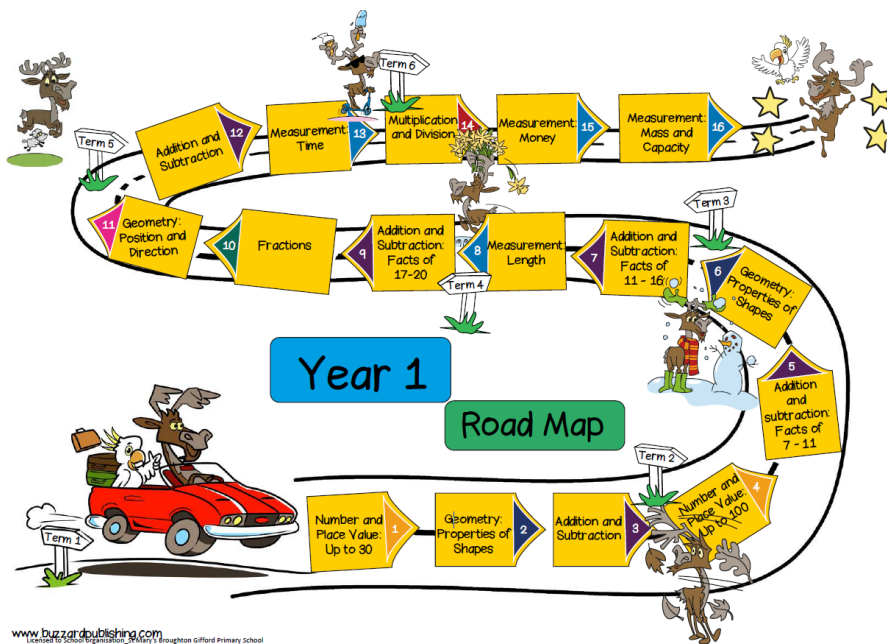
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read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	round any number up to 1 000 000 to the nearest 10 000, 100 000, 10 000 and 100 000	solve number problems and practical problems that involve all of the above	read Roman numerals to 1000 (M) and recognise years written in Roman numerals	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	add and subtract numbers mentally with increasingly large numbers	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit	round any whole number to a required degree of accuracy	use negative numbers in context, and calculate intervals across zero	solve number problems and practical problems that involve all of the above	multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context	divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context	perform mental calculations, including with mixed operations and large numbers	identify common factors, common multiples and prime numbers	
solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	identify multiples and factors, including finding all factor pairs of a number and common factors of 2 numbers	know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	establish whether a number up to 100 is prime and recall prime numbers up to 10	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 and divide numbers mentally, drawing upon known facts	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	multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000	recognise and use square numbers and cube numbers, and the notation for squared ( $^2$ ) and cubed ( $^3$ )	use their knowledge of the order of operations to carry out calculations involving the four operations	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	solve problems involving addition, subtraction, multiplication and division	use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	use common factors to simplify fractions; use common multiples to express fractions in the same denominator	compare and order fractions, including fractions $> 1$	add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$ ]	divide proper fractions by whole numbers [for example, $\frac{1}{2} \div 2 = \frac{1}{4}$ ]	
solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	solve problems involving addition, subtraction, multiplication and division and a combination of these including understanding the meaning of the equals sign	solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	<b>Stage 5</b>	compare and order fractions whose denominators are all multiples of the same number	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	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. $\frac{7}{4} = 1\frac{3}{4}$ , $1\frac{3}{4} = \frac{7}{4}$ )	add and subtract fractions with the same denominator and denominators that are multiples of the same number	associate a fraction with division and calculate decimal fractions (for example, 0.375) for a simple fraction (for example, $\frac{3}{8}$ )	identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places	multiply one-digit numbers with up to two decimal places by whole numbers	<b>Stage 6</b>	use written division methods in cases where the answer has up to two decimal places	solve problems involving the relationship between simple fractions, decimals and percentages including in different contexts	recall and use equivalence between simple fractions, decimals and percentages including in different contexts	solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts	generate and describe linear number sequences	express missing number problems algebraically	
multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	read and write decimal numbers as fractions (for example, $0.71 = \frac{71}{100}$ )	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	<b>Mathematics</b>	round decimals with two decimal places to the nearest whole number and to one decimal place	read, write, order and compare numbers with up to three decimal places	solve problems involving number up to three decimal places	solve problems involving the calculation of percentages (for example, of measures) and such as 15% of 360) and use 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	use, read, write and convert between standard units, converting measurements of length, mass, volume and time from smaller unit of measure to a larger unit, and vice versa, using decimal notation up to 3 places	convert between miles and kilometres	recognise that shapes with the same area can have different perimeters and vice versa	recognise when it is possible to use the formulae for area and volume of shapes	calculate the area of parallelograms and triangles	calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres ( $\text{cm}^3$ ) and cubic metres ( $\text{m}^3$ ), and extending to other units (e.g. $\text{mm}^3$ and $\text{km}^3$ )			
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, and as a decimal	solve problems requiring knowledge of percentages and decimal equivalents of $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{3}{4}$ , $\frac{1}{5}$ and those fractions with a denominator of a multiple of 10 or 25.	convert between different units of metric measure (for example, kilometre and metre, centimetre and millimetre, gram and milligram, litre and millilitre)	understand and use approximate equivalence between metric units and common imperial units such as inches, pounds and pints	measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres	calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres ( $\text{cm}^2$ ) and square metres ( $\text{m}^2$ ) and estimate the area of irregular shapes	estimate volume (for example, using $1 \text{ cm}^3$ blocks to build cuboids (including cubes) and capacity (for example, using water)	solve problems involving converting between units of time	use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation, including scaling.	find pairs of numbers that satisfy number sentences involving two unknowns	enumerate possibilities of combinations of two variables	solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate	compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons	illustrate and name parts of circle, including radius, diameter and circumference and know that the diameter is twice the radius	recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	describe positions on the full coordinate grid (all four quadrants)	draw and translate simple shapes on the coordinate plane, and reflect them in the axes	interpret and construct pie charts and line graphs and use these to solve problems	calculate and interpret the mean as an average
identify 3-D shapes, including cubes and other cuboids, from 2-D representations	know angles are measured in degrees; estimate acute, obtuse and reflex angles	draw given angles, and measure them in degrees ( $^\circ$ )	identify: angles at a point and one whole turn (total $360^\circ$ ); angles at a point on a straight line and a full turn (total $180^\circ$ ); other multiples of $90^\circ$	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	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	solve comparison, sum and difference problems using information presented in a line graph	complete, read and interpret information in tables, including timetables	draw 2-D shapes using given dimensions and angles	recognise, describe and build simple 3-D shapes including making nets	compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons	illustrate and name parts of circle, including radius, diameter and circumference and know that the diameter is twice the radius	recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	describe positions on the full coordinate grid (all four quadrants)	draw and translate simple shapes on the coordinate plane, and reflect them in the axes	interpret and construct pie charts and line graphs and use these to solve problems	calculate and interpret the mean as an average	

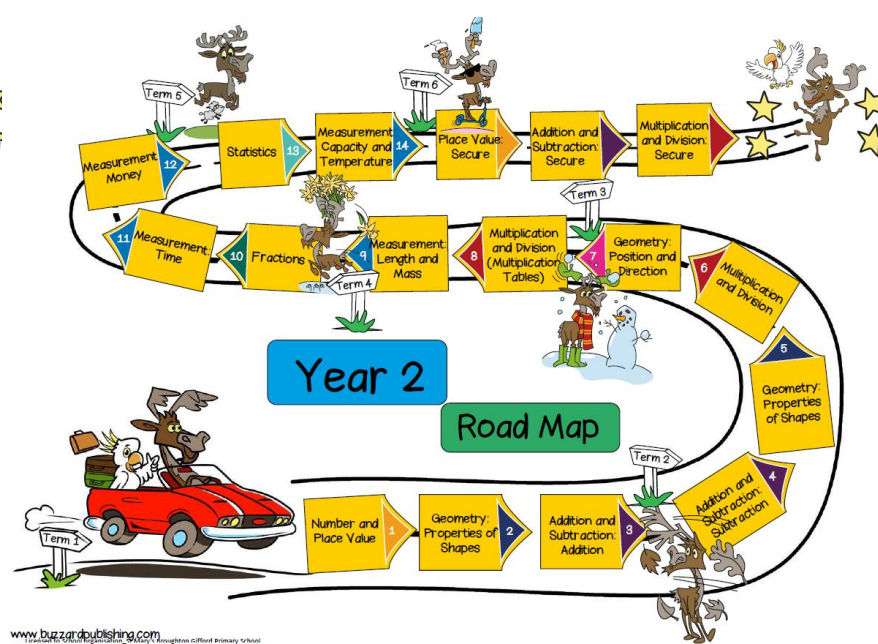


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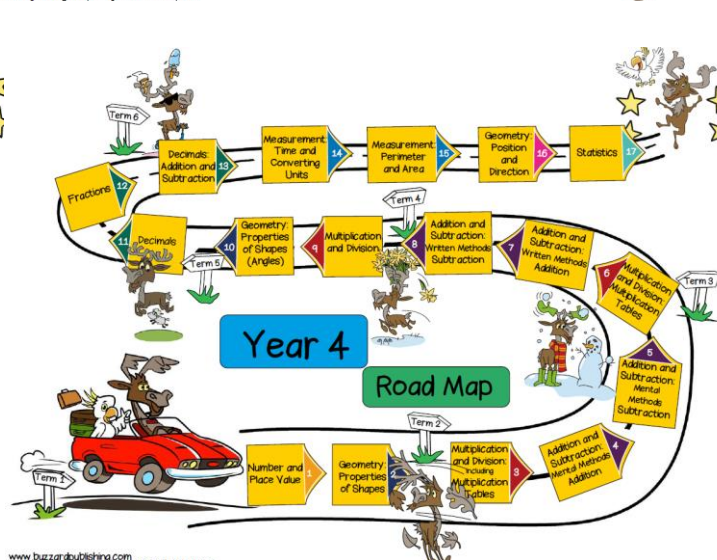
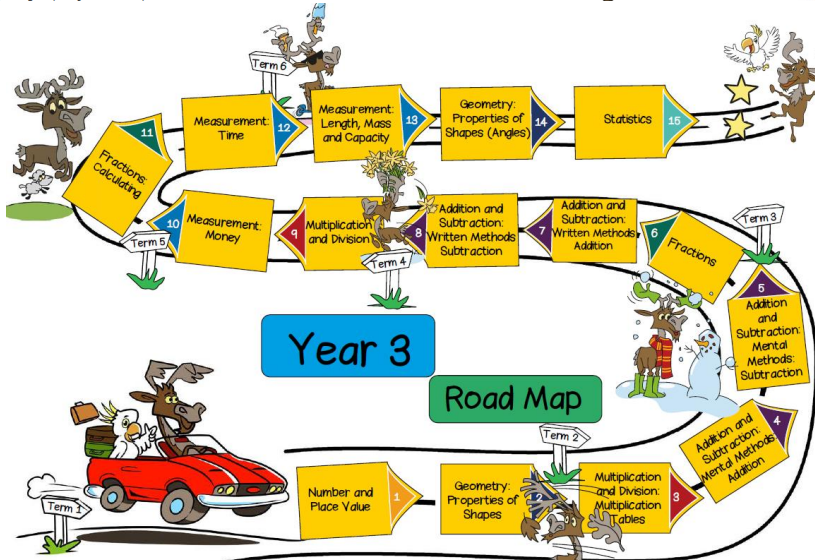
## Learning Pathway



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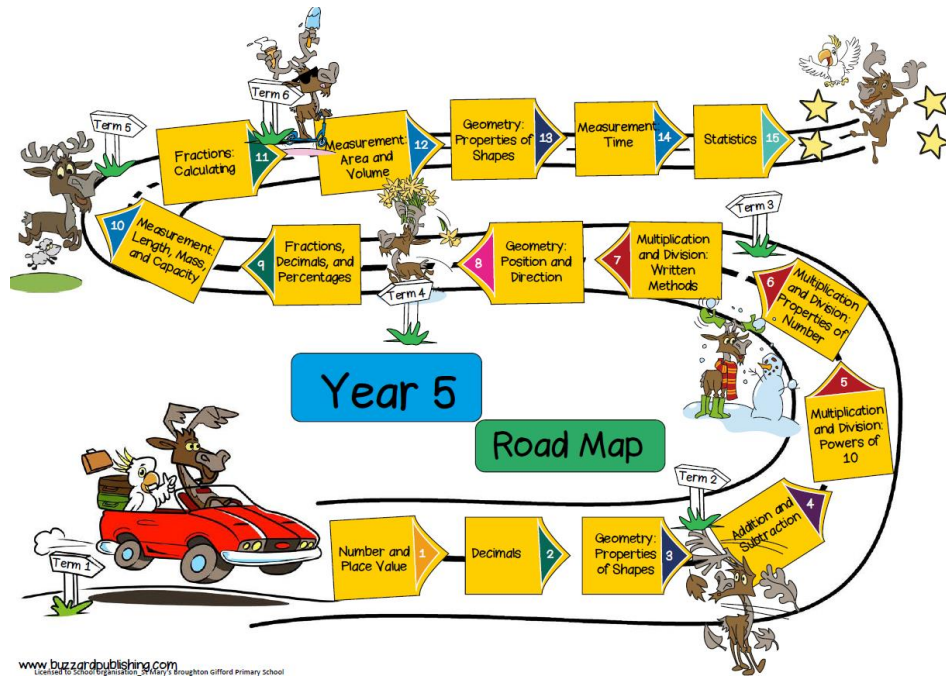


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# The St Mary's Primary Mathematics Curriculum



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