St. Giles' & St. George's Academy

Newcastle



MATHS

## Mathematics Curriculum

# Maths Intent, Implementation and Impact

**Inspired by our Christian faith, we guide children on a personalised journey towards achievement. As a learning community, we are committed to ensuring that children are equipped with, skills and aspirations to reach their full potential in mind, body, heart and spirit.**

## Intent

As a Church of England school, our Maths curriculum is underpinned by our gospel values. These values are used and applied throughout the Maths curriculum. Our children are learned and wise in the way that they practise and apply skills in a variety of different contexts and apply these skills to real-life contexts, problem solving and reasoning. They show curiosity, attentiveness and active learning through their independence within lessons, following their own learning journey, taking charge of their own learning by using a variety of resources and acting on their 'pink pen' feedback, through active marking within each lesson. Our gospel values create a solid moral background for our children and encourage them to become better members of society, with self-belief and aspirations.

The main aim of our Maths curriculum is to provide children with a foundation for understanding number, reasoning, thinking logically and problem solving with resilience, so that they are fully prepared for the future. These skills are progressive and are built on year after year from EYFS all the way through to Year 6. This ensures that children are given opportunities to practise and apply Maths skills in different contexts and make good progress in all areas. By adopting a Mastery approach (following White Rose Maths), it is also intended that all children, regardless of their starting point, will maximise their academic achievement and leave our school with an appreciation and enthusiasm for Maths, resulting in a lifelong positive relationship with number.

We want our pupils to become fluent in the fundamentals of mathematics, to be able to reason and to solve problems. Our curriculum embraces these National Curriculum aims, and provides guidance to help pupils to become visualisers (through a CPA approach), describers (clear focus on mathematical talk and language) and experimenters (becoming fluent in maths).

Our gospel values, core skills and key outcomes will raise aspirations and ensure that our children are more than ready for the next stage in their Maths journey.

## Implementation

Our Maths curriculum aims to ensure that:
• There is a progression of maths skills across the school
• Children are taught and practice the 'most efficient' methods of calculation
• We provide meaningful, stimulating learning experiences using the children's real life experiences as much as possible
• We inspire children to confidently recall and use their mathematical knowledge and skills
• Teaching staff model a high standard of problem solving to secure high expectations
• We provide a language-rich environment that promotes a use of correct mathematical terminology
• Pupils are provided with a range of opportunities to apply key mathematical skills, across different contexts to develop mastery. Including the use of the Concrete, Pictorial and Abstract (CPA) approach.

Lessons are planned and sequenced so that new knowledge and skills build on what has been taught before. Teachers follow the White Rose Maths blocks, creating learning journeys of multiple small steps. Each learning journey has a problem solving and reasoning objective for each small step, allowing all children to access a mastery curriculum. Staff also refer to the Calculation Policy when teaching formal methods, understanding that sometimes children find their own efficient methods along the way.
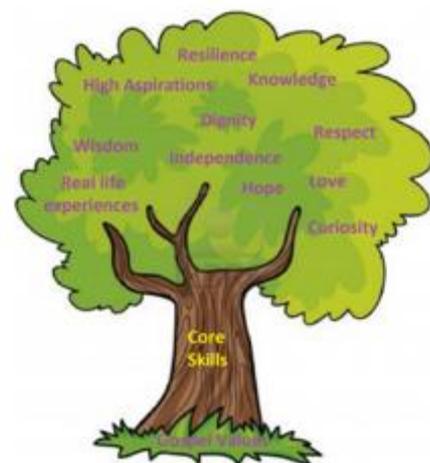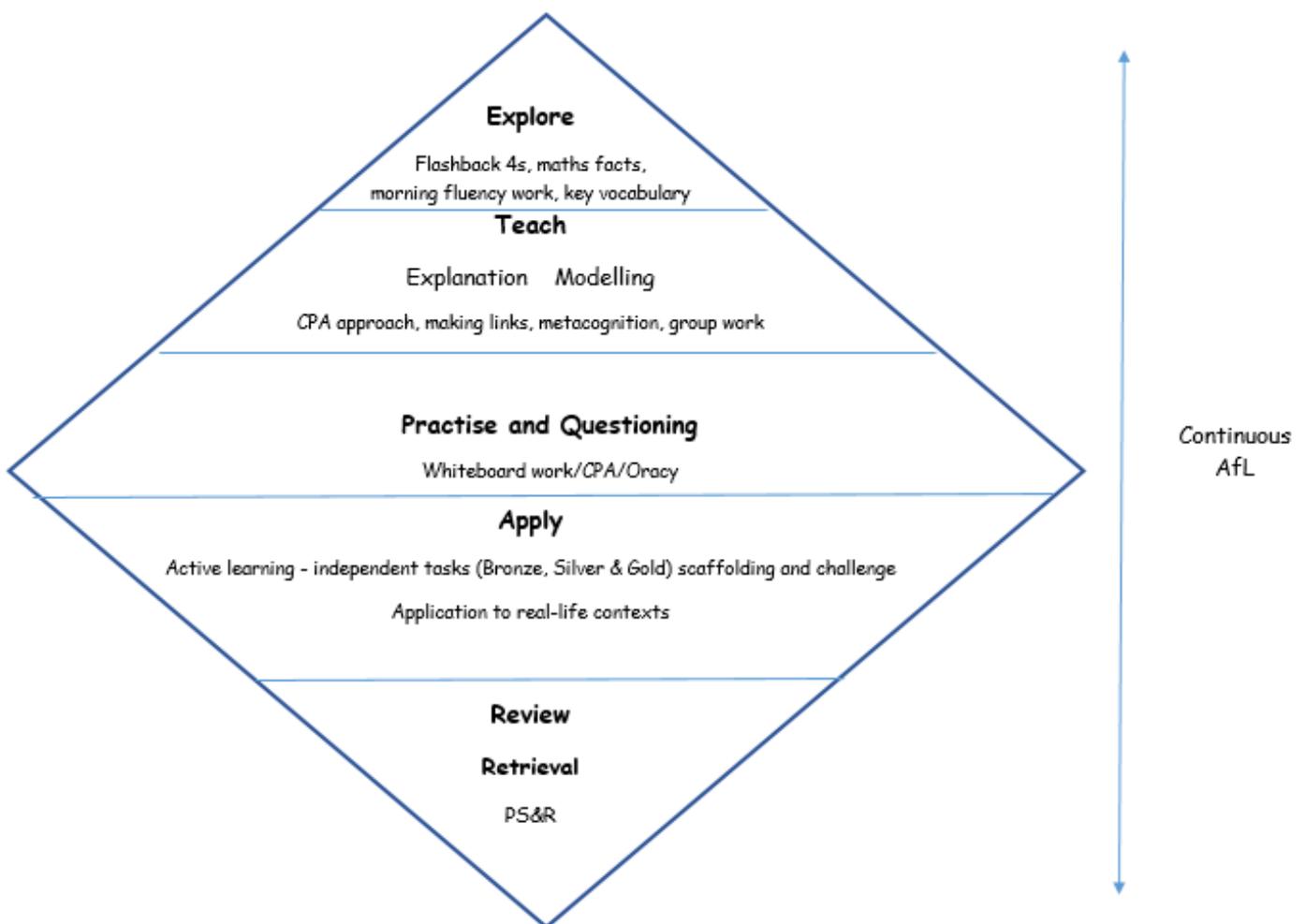
Maths is taught for 45 minutes per day in KS1 and 1 hour per day in KS2. EYFS have two maths mornings per week and then have group tasks and continuous provision opportunities for maths throughout the rest of the week.

Lessons start with an arithmetic warm up and/or 'Flashback 4' which allows them to revisit learning from that week, previous topics and previous years. An AfL task is used to assess the children's level of understanding for each small step and this information is used to ensure children access the correct scaffolding or challenge. Throughout each small step, children have the opportunity to learn through the CPA approach (where appropriate) and active learning.  Assessment and feedback will be given throughout the lesson, verbally and through 'pink pen' marking, which will focus on misconceptions and next steps for learning. Challenges are provided for all children in each lesson and these mostly focus on application style questions and/or problem solving and reasoning activities. Lessons and blocks then end with a review that focus on the key learning from that session and end of block assessments.

**Each lesson follows the following sequence:**

Lesson and learning journey

**Explore**

Flashback 4s, maths facts, morning fluency work, key vocabulary

**Teach**

Explanation    Modelling

CPA approach, making links, metacognition, group work

**Practise and Questioning**

Whiteboard work/CPA/Oracy

**Apply**

Active learning - independent tasks (Bronze, Silver & Gold) scaffolding and challenge

Application to real-life contexts

**Review**

**Retrieval**

PS&R

Continuous AfL

Maths is taught as part of the Maths area of the EYFS learning and development. In reception, children are introduced to numbers and focus on number names, cardinal values and subitising. The children then progress on to calculations involving addition and subtraction using number lines and concrete objects. With apparatus, the children explore doubling, sharing and odd and even numbers. Children are taught their number bonds to ten and the mathematical foundations ready to progress through their school learning journey. Reception children are assessed against the appropriate ELGs.

The foundation stage follows the journey in the following sequence:



## Reception Theme Subject Journey

### Explore
Children have the opportunity to explore the topic and subject area through tuff trays and child led learning. KWL grids and mind maps used to identify prior learning.

### Teach
Input and carpet sessions, in the moment teaching opportunities, concrete materials, teaching of new topic specific vocabulary.
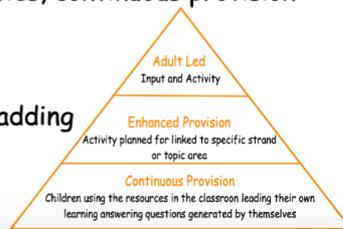
### Practise
Group work, teacher guided sessions, tuff tray activities after input, key questions for children to explore and investigate on their own after being taught skills.

### Apply
Independent tasks, some enhanced provision opportunities, continuous provision opportunities, child-led learning

### Review
Mini input on previous learning, KWL revisit, mind map adding repeating 'explore' activities.



**Adult Led**
Input and Activity

**Enhanced Provision**
Activity planned for linked to specific strand or topic area

**Continuous Provision**
Children using the resources in the classroom leading their own learning answering questions generated by themselves

In Maths, work is recorded in an exercise book and marked in line with the marking policy.

**Impact**
The impact of the Mathematics emphasis and teaching at St Giles' & St George's:
A mathematical concept or skill has been mastered when a child can show it in multiple ways:
 -using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations.
- Children demonstrate quick recall of facts and procedures. This includes the recollection of the times tables.
- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics.
- Children show confidence in believing that they will achieve.
- Children show a high level of pride in the presentation and understanding of the work.

At St Giles' & St George's we expect that by the end of Y6 our children will:
**Become fluent** in the fundamentals of mathematics.
**Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations.
**Solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication.

# Adaptive Teaching

To ensure all pupils can access our Maths curriculum and lessons, we make the following adjustments where necessary:

| Cognition and Learning | Communication and Language | SEMH | Physical and Sensory |
|---|---|---|---|
| • Alternative methods of recording (talking tins, laptops, practical tasks)<br>• Differentiated tasks – sometimes from the previous year group objectives<br>• A range of practical equipment to support<br>• Visual supports<br>• Knowledge organisers with worked examples<br>• Pre-teaching of vocabulary<br>• Teaching of key skills<br>• Coloured overlays<br>• Timers and chunked activities<br>• Sit close to the board<br>• Allow extra time | • Talking tins<br>• Pre-teaching language<br>• Visuals to support<br>• Now/Next<br>• Increased focus on number and place value<br>• Extra thinking time<br>• Explicit instructions<br>• Steps to success (one task at a time) | • Brain and movement breaks<br>• Smaller tasks to ensure they are manageable<br>• CalmBrain<br>• Reward time<br>• Reflection areas (weighted blankets)<br>• Sensory/fidget toys<br>• Sit near to the teacher<br>• Steps to success (one task at a time)<br>• Peer buddies | • Own learning space (workstation)<br>• Brain/Sensory breaks<br>• Appropriate seating<br>• Fidget toys<br>• Adapted resources (scissors, rulers etc)<br>• Sloping board<br>• Alternative methods of recording<br>• Wobble cushions<br>• Pencil grips/sloping boards |

# Mathematics Overview

| | Autumn Term | Spring Term | Summer Term |
|---|---|---|---|
| Reception | Match, sort and compare<br>Talk about measure and pattern<br>It's me 1, 2, 3<br>Shape – circles, triangles and 4-sided shapes<br>Counting to 5 | Numbers up to 10<br>Mass and Capacity<br>Length, height and time<br>Explore 3D shapes | To 20 and beyond<br>How many now?<br>Manipulate, compose and decompose<br>Sharing and grouping<br>Visualise, build and map<br>Maker connections |
| Year 1 | Number: Place Value<br>Number: Addition and Subtraction<br>Geometry: Shape | Number: Place Value<br>Number: Addition and Subtraction<br>Measurement: Length and Height<br>Measurement: Mass and volume | Number: Multiplication and Division<br>Number: Fractions<br>Geometry: Position and Direction<br>Number: Place Value<br>Measurement: Money<br>Measurement: Time |
| Year 2 | Number: Place Value<br>Number: Addition and Subtraction<br>Geometry: Shape | Measurement: Money<br>Number: Multiplication and Division<br>Measurement: Length and Height<br>Measurement: Mass, capacity and temperature | Number: Fractions<br>Measurement: Time<br>Statistics<br>Geometry: Position and Direction |
| Year 3 | Number: Place Value<br>Number: Addition and Subtraction<br>Number: Multiplication and Division | Number: Multiplication and Division<br>Measurement: Length,<br>Number: Fractions<br>Measurement: Mass and Capacity | Number: Fractions<br>Measurement: Money and Time<br>Geometry: Properties of shape<br>Statistics |
| Year 4 | Number: Place Value<br>Number: Addition and Subtraction<br>Number: Multiplication and Division<br>Measurement: Area | Number: Multiplication and division<br>Measurement: Length and perimeter<br>Number: Fractions<br>Number: Decimals | Number: Decimals<br>Measurement: Money and Time<br>Geometry: Shape, position and direction<br>Statistics |
| Year 5 | Number: Place Value<br>Number: Four operations<br>Number: Fractions | Number: Multiplication and division<br>Number: Fractions, Decimals & Percentages<br>Measurement: Perimeter and area<br>Statistics | Number: Decimals and negative numbers<br>Geometry: Properties of Shape<br>Geometry: Position and Direction<br>Measure: Converting units and volume |
| Year 6 | Number: Place Value<br>Number: Four operations<br>Number: Fractions<br>Measurement: Converting units | Number: ratio, algebra, decimals, fractions, percentages,<br>Measure: area, perimeter and volume<br>Statistics | Geometry: shape<br>Geometry: position and direction<br>Consolidation work and themed projects involving problem solving |

NB: Below is the skills and ready to progress progression for Y1 – Y6. Skill progression for EYFS can be found here:
https://assets.whiteroseeducation.com/Resources/early-years/reception/Reception%20curriculum%20mapping.pdf

# Place value skills progression

## Place value: Count

| 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<br>• Count 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 and backward | • count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number | • count in multiples of 6, 7, 9, 25 and 1000<br>• count backwards through zero to include negative numbers | • count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000<br>• count forwards and backwards with positive and negative whole numbers, including through zero | |
| Autumn 1<br>Spring 1<br>Spring 3<br>Summer 4 | Autumn 1 | Autumn 1<br>Autumn 3 | Autumn 1<br>Autumn 4 | Autumn 1<br>Summer 4 | |

## Place value: Represent

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| • identify and represent numbers using objects and pictorial representations<br>• read and write numbers to 100 in numerals<br>• 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<br>• identify, represent and estimate numbers using different representations, including the number line | • identify, represent and estimate numbers using different representations<br>• read and write numbers up to 1000 in numerals and in words | • identify, represent and estimate numbers using different representations<br>• 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<br>• read Roman numerals to 1000 (M) and recognise years written in Roman numerals | • read, write, (order and compare) numbers up to 10 000 000 and determine the value of each digit |
| Autumn 1<br>Spring 1<br>Spring 3<br>Summer 4 | Autumn 1 | Autumn 1 | Autumn 1 | Autumn 1 | Autumn 1 |

# Place value: Use and compare

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--------|--------|--------|--------|--------|--------|
| • given a number, identify one more and one less | • recognise the place value of each digit in a two-digit number (tens, ones)<br>• compare and order numbers from 0 up to 100; use <, > and = signs | • recognise the place value of each digit in a three-digit number (hundreds, tens, ones)<br>• compare and order numbers up to 1000 | • find 1000 more or less than a given number<br>• recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)<br>• order and compare numbers beyond 1000 | • (read, write) order and compare numbers to at least 1 000 000 and determine the value of each digit | • (read, write), order and compare numbers up to 10 000 000 and determine the value of each digit |
| Autumn 1<br>Spring 1<br>Spring 3<br>Summer 4 | Autumn 1 | Autumn 1 | Autumn 1 | Autumn 1 | Autumn 1 |

# Place value: Problems/Rounding

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--------|--------|--------|--------|--------|--------|
|  | • use place value and number facts to solve problems | • solve number problems and practical problems involving these ideas | • round any number to the nearest 10, 100 or 1000<br>• solve number and practical problems that involve all of the above and with increasingly large positive numbers | • interpret negative numbers in context<br>• round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000<br>• solve number problems and practical problems that involve all of the above | • round any whole number to a required degree of accuracy<br>• use negative numbers in context, and calculate intervals across zero<br>• solve number and practical problems that involve all of the above |
|  | Autumn 1 | Autumn 1 | Autumn 1 | Autumn 1 | Autumn 1 |

# Four operations skills progression

## Addition & subtraction: Calculations

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| • 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:<br>➢ a two-digit number and ones<br>➢ a two-digit number and tens<br>➢ two two-digit numbers<br>➢ adding three one-digit numbers | • add and subtract numbers mentally, including:<br>➢ a three-digit number and ones<br>➢ a three-digit number and tens<br>➢ a three-digit number and hundreds<br>• 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)<br>• add and subtract numbers mentally with increasingly large numbers | • perform mental calculations, including with mixed operations and large numbers<br>• use their knowledge of the order of operations to carry out calculations involving the four operations |
| Autumn 2<br>Spring 2 | Autumn 2 | Autumn 2 | Autumn 2 | Autumn 2 | Autumn 2 |

## Addition & subtraction: Problems

| 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:<br>➢ using concrete objects and pictorial representations, including those involving numbers, quantities and measures<br>➢ 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<br>• solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign | • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why |
| Autumn 2<br>Spring 2 | Autumn 2 | Autumn 2 | Autumn 2 | Autumn 2 | Autumn 2 |

# Multiplication & division: Recall/Use

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| | • recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers<br>• show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot | • 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<br>• 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<br>• recognise and use factor pairs and commutativity in mental calculations | • identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers<br>• know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers<br>• establish whether a number up to 100 is prime and recall prime numbers up to 19<br>• recognise and use square numbers and cube numbers, and the notation for squared ($^2$) and cubed ($^3$) | • identify common factors, common multiples and prime numbers<br>• use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy |
| | Spring 2 | Autumn 3<br>Spring 1 | Autumn 4<br>Spring 1 | Autumn 3 | Autumn 2 |

# Multiplication & division: Calculations

| 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 | • 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<br>• multiply and divide numbers mentally drawing upon known facts<br>• 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<br>• multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 | • multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication<br>• 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<br>• 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<br>• perform mental calculations, including with mixed operations and large numbers |
| | Spring 2 | Autumn 3<br>Spring 1 | Spring 1 | Autumn 3<br>Spring 1 | Autumn 2 |

# Multiplication & division: Problems

| 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<br>• solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates | • solve problems involving addition, subtraction, multiplication and division |
| Summer 1 | Spring 2 | Spring 1 | Spring 1 | Autumn 3<br>Spring 1 | Autumn 2 |

# Multiplication & division: Combined

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| | | | | • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign | • use their knowledge of the order of operations to carry out calculations involving the four operations |
| | | | | Spring 1 | Autumn 2 |

# Fractions, decimals and percentages skills progression

## Fractions: Recognise and write

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| • recognise, find and name a half as one of two equal parts of an object, shape or quantity<br>• recognise, find and name a quarter as one of four equal parts of an object, shape or quantity | • recognise, find, name and write fractions $\frac{1}{3}, \frac{1}{4}, \frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity | • 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<br>• recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators<br>• recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators | • count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. | • identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths<br>• recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$] | |
| Summer 2 | Summer 1 | Spring 3 | Spring 4<br>Summer 1 | Autumn 4 | |

## Fractions: Compare

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| | • Recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ | • recognise and show, using diagrams, equivalent fractions with small denominators<br>• compare and order unit fractions, and fractions with the same denominators | • recognise and show, using diagrams, families of common equivalent fractions | • compare and order fractions whose denominators are all multiples of the same number | • use common factors to simplify fractions; use common multiples to express fractions in the same denomination<br>• compare and order fractions, including fractions > 1 |
| | Summer 1 | Spring 3 | Spring 3 | Autumn 4 | Autumn 3 |

# Fractions: Calculations

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--------|--------|--------|--------|--------|--------|
| | • write simple fractions for example, $\frac{1}{2}$ of 6 = 3 | • add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$] | • add and subtract fractions with the same denominator | • add and subtract fractions with the same denominator and denominators that are multiples of the same number<br>• multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams | • add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions<br>• multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]<br>• divide proper fractions by whole numbers [for example $\frac{1}{3} \div 2 = \frac{1}{6}$] |
| | Summer 1 | Summer 1 | Spring 3 | Autumn 4<br>Spring 2 | Autumn 3<br>Autumn 4 |

# Fractions: Solve problems

| 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 | | |
| | | Spring 3<br>Summer 1 | Spring 3 | | |

# Decimals: Recognise, write, compare

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--------|--------|--------|--------|--------|--------|
| | | | • recognise and write decimal equivalents of any number of tenths or hundredths<br>• recognise and write decimal equivalents to $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$<br>• round decimals with one decimal place to the nearest whole number<br>• compare numbers with the same number of decimal places up to two decimal places | • read and write decimal numbers as fractions [for example, 0.71 = $\frac{71}{100}$]<br>• recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents<br>• round decimals with two decimal places to the nearest whole number and to one decimal place<br>• 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 |
| | | | Spring 4<br>Summer 1 | Spring 3<br>Summer 3 | Spring 3 |

# Fractions, decimals and percentages

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--------|--------|--------|--------|--------|--------|
| | | | • solve simple measure and money problems involving fractions and decimals to two decimal places | • 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<br>• solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25 | • associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]<br>• recall and use equivalences between simple fractions, decimals and percentages, including in different contexts |
| | | | Spring 3<br>Spring 4<br>Summer1 | Spring 3 | Spring 3<br>Spring 4 |

# Ratio, proportion and algebra skills progression

## Ratio and proportion

**MATHS**

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| | | | | | • solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts<br>• solve problems involving the calculation/use of percentages for comparison<br>• solve problems involving similar shapes where the scale factor is known or can be found<br>• solve problems involving unequal sharing and grouping using knowledge of fractions and multiples |
| | | | | | Spring 1 |

## Algebra

**MATHS**

| 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 $7 = \square - 9$ | • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems | • solve problems, including missing number problems | | | • use simple formulae<br>• generate and describe linear number sequences<br>• express missing number problems algebraically<br>• find pairs of numbers that satisfy an equation with two unknowns<br>• enumerate possibilities of combinations of two variables |
| | | | | | Spring 2 |

Note – although formal algebraic notation is not introduced until Y6, algebraic thinking starts much earlier as exemplified by the 'missing number' objectives from Y1/2/3

# Statistics skills progression

## Present and interpret 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 |
|  | Summer 3 | Summer 5 | Summer 5 | Spring 5 | Spring 6 |

## Solve statistical problems

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--------|--------|--------|--------|--------|--------|
|  | • ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity<br>• ask and answer questions about totalling and comparing categorical data | • 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 | • 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 |
|  | Summer 3 | Summer 5 | Summer 5 | Spring 5 | Spring 6 |

# Measurement skills progression

## Using measures

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--------|--------|--------|--------|--------|--------|
| • compare, describe and solve practical problems for:<br>➢ lengths and heights<br>➢ mass/weight<br>➢ capacity and volume<br>➢ time<br>• measure and begin to record the following:<br>➢ lengths and heights<br>➢ mass/weight<br>➢ capacity and volume<br>➢ 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<br>• compare and order lengths, mass, volume/capacity and record the results using >, < and = | • measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) | • Convert between different units of measure [for example, kilometre to metre; hour to minute]<br>• estimate, compare and calculate different measures | • convert between different units of metric measure<br>• understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints<br>• use all four operations to solve problems involving measure [for example, 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 3 d.p. where appropriate<br>• 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 3 d.p.<br>• convert between miles and kilometres |
| Spring 4<br>Spring 5<br>Summer 6 | Spring 3<br>Spring 4 | Spring 2<br>Spring 4 | Spring 2<br>Summer 3 | Spring 4<br>Summer 5<br>Summer 6 | Autumn 5 |

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## Time

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--------|--------|--------|--------|--------|--------|
| • sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]<br>• recognise and use language relating to dates, including days of the week, weeks, months and years<br>• tell the time to the hour and half past the hour and draw the hands on a clock face to show these times | • compare and sequence intervals of time<br>• 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<br>• know the number of minutes in an hour and the number of hours in a day | • tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks<br>• estimate and read 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<br>• know the number of seconds in a minute and the number of days in each month, year and leap year<br>• compare durations of events [for example to calculate the time taken by particular events or tasks] | • read, write and convert time between analogue and digital 12- and 24-hour clocks<br>• solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days | • solve problems involving converting between units of time | • use, read, write and convert between standard units, converting measurements of time from a smaller unit of measure to a larger unit, and vice versa<br><br>Note – In the WRM schemes, time conversions are covered in Y5; the Y6 block concentrates on metric units. |
| Summer 6 | Summer 2 | Summer 3 | Summer 3 | Summer 5 | Autumn 5 |

# Money

| 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<br>• find different combinations of coins that equal the same amounts of money<br>• solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change | • add and subtract amounts of money to give change, using both £ and p in practical contexts | • estimate, compare and calculate different measures, including money in pounds and pence | • use all four operations to solve problems involving measure [for example, money] | |
| Summer 5 | Spring 1 | Summer 2 | Summer 2 | Summer 3 | |

# Perimeter, area, volume

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|--------|--------|--------|--------|--------|--------|
| | | • measure the perimeter of simple 2-D shapes | • measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres<br>• find the area of rectilinear shapes by counting squares | • measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres<br>• calculate and compare the area of rectangles (including squares) and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes<br>• estimate volume [for example, using blocks to build cuboids] and capacity [for example, using water] | • recognise that shapes with the same areas can have different perimeters and vice versa<br>• recognise when it is possible to use formulae for area and volume of shapes<br>• calculate the area of parallelograms and triangles<br>• calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units |
| | | Spring 2 | Autumn 3<br>Spring 2 | Spring 4<br>Summer 6 | Spring 5 |

# Geometry skills progression

## 2-D shapes

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| • recognise and name common 2-D shapes [for example, rectangles (including squares), circles and triangles] | • identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line<br>• identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]<br>• compare and sort common 2-D shapes and everyday objects | • draw 2-D shapes | • compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes<br>• identify lines of symmetry in 2-D shapes presented in different orientations | • distinguish between regular and irregular polygons based on reasoning about equal sides and angles.<br>• use the properties of rectangles to deduce related facts and find missing lengths and angles | • draw 2-D shapes using given dimensions and angles<br>• compare and classify geometric shapes based on their properties and sizes<br>• illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius |
| Autumn 3 | Autumn 3 | Summer 4 | Summer 4 | Summer 1 | Summer 1 |

## 3-D shapes

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| • recognise and name common 3-D shapes [for example, cuboids (including cubes), pyramids and spheres] | • recognise and name common 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]<br>• compare and sort common 3-D shapes and everyday objects | • make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them | | • identify 3-D shapes, including cubes and other cuboids, from 2-D representations | • recognise, describe and build simple 3-D shapes, including making nets |
| Autumn 3 | Autumn 3 | Summer 4 | | Summer 1 | Summer 1 |

# Position and direction

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| • describe position, direction and movement, including whole, half, quarter and three-quarter turns | • order and arrange combinations of mathematical objects in patterns and sequences<br>• 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<br>• describe movements between positions as translations of a given unit to the left/right and up/down<br>• plot specified points and draw sides to complete a given polygon | • 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)<br>• draw and translate simple shapes on the coordinate plane, and reflect them in the axes |
| Summer 3 | Summer 4 | | Summer 6 | Summer 2 | Summer 2 |

# Angles and lines

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| | | • recognise angles as a property of shape or a description of a turn<br>• 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<br>• identify horizontal and vertical lines and pairs of perpendicular and parallel lines | • identify acute and obtuse angles and compare and order angles up to two right angles by size<br>• identify lines of symmetry in 2-D shapes presented in different orientations<br>• complete a simple symmetric figure with respect to a specific line of symmetry | • know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles<br>• draw given angles, and measure them in degrees<br>• identify:<br>➤ angles at a point and one whole turn (total 360°)<br>➤ angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°)<br>➤ other multiples of 90° | • find unknown angles in any triangles, quadrilaterals, and regular polygons<br>• recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles |
| | | Summer 4 | Summer 4 | Summer 2 | Summer 1 |

# Calculation Policies

https://assets.whiteroseeducation.com/new-schemes/WRM%20calculation%20policy%202024%20Nursery%20and%20reception.pdf

**Nursery and reception**

**Calculation policy**

Updated September 2024

https://assets.whiteroseeducation.com/new-schemes/WRM%20calculation%20policy%202024%20All%20year%20groups.pdf

**Primary maths**

**Calculation policy**

Updated September 2024

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