The Willows School Academy Trust

Maths Policy

Reviewed: September 2024

Next Review: September 2025

Maths at The Willows

This policy sets out the approach to teaching and learning maths at our school. Our separate Calculation Policy explains in detail how we teach addition, subtraction, multiplication and division.

Aims

At The Willows School we believe all pupils are capable of achieving a high standard of mathematics. We believe that developing early number sense, using a range of images and resources, are essential foundations for more advanced maths and problem solving skills. We build on this early knowledge to recall and apply mathematics knowledge fluently and rapidly.

We teach maths with a growth mindset in mind - creating a love of learning and resilience so that levels of thinking can become sophisticated. We challenge higher levels of thinking, through problem solving and questioning, to stimulate mathematical creativity.

Problem solving is at the heart of our teaching. We aim to help learners to appreciate the wonder of maths cross-curricularly through science and technology, creating lifelong mathematicians.

We aim for pupils to have mastered the primary mathematics curriculum by the time they leave KS2, so that they are ready for the next step in their education.

They will master this by:

- being fluent with the basics (rapid recall, conceptual understanding);
- being able to reason mathematically (making generalisations, justifications and proofs using mathematical language);
- being able to solve problems (applying, breaking down problems).

Teachers at The Willows are passionate in their expectation of the children's progression in mathematics, and are creative in how they teach maths. Using evidence from the NCETM as well as our own understanding and research on how children develop their Mathematical understanding, they develop great lessons that deepen children's understanding. Retrieval, checking for understanding and scaffolded approaches which incorporate Mastery and Greater depth are key to our teaching and learning of mathematics.

Classroom Organisation

Children are taught in mixed attainment classes. There is an expectation that teachers' knowledge of levels of attainment are established quickly at the start of a new school year, using a combination of test data, teacher assessment by the previous teacher and initial assessments within lessons. With end of year expectations in mind, teachers will plan lessons in which all the children are working on the same mathematical concept – for example place value or division.

Teachers will use a teaching for mastery approach in conjunction with the CPA approach. At our school this means that the whole class will work together in some lessons, particularly those that introduce and explore a new concept. Regardless of the topic, concrete materials will be provided for every lesson where possible so that students will be able to access the tools they require to be independent learners. Students will be encouraged to use a variety of concrete, pictorial or abstract strategies to demonstrate their understanding in multiple ways.

Teachers will use an 'I Do' (teacher led), working with the whole class, focusing on key representations strategies and explaining the basic concepts we will be learning. We then move on to the 'We Do' part, where students are presented with questions and misconceptions, modelled examples, finding the mistakes, aiming for all children to become secure in the concept, lastly is the 'You Do' approach where there is independent practice. In some instances where some students require further clarification small

group work may be appropriate.

Best practice at our school is keeping the whole class working on the same concept, taking small steps to master this but also assessing progress and using 'flexible grouping': grouping that is informed by day to day marking and assessment of misconceptions.' When appropriate, throughout the lesson, the children will be drawn together to learn from each other, share misconceptions and 'penny drop' moments, so they can progress as a class. Whatever their level of attainment, children should not experience repeated failure or effortless success. This will be monitored through teacher assessment, marking and student self-assessment.

Display and Maths Tables
All classrooms are expected to have a maths display which details learning that the children have engaged in. There should show a development in their learning ability, showcasing the differentiated levels of learning. Photos are encouraged for both bookwork and display.

Displays do not always accurately show what the students are learning in real time, topics often move on quickly. Maths tables should demonstrate what topic the students are learning in real time, they should have relevant questions and resources to support collaborative questioning and answering.

Planning

The core of our planning is taken from the National Curriculum for Mathematics and teachers use the Numicon Handbooks 1-6, White rose Maths, Maths No Problem, I SEE REASONING/PROBLEM SOLVING and NCETM Teaching for Mastery materials support their weekly lesson sequences. These documents set out key curriculum targets, teaching notes and suggested approaches for each year. The class teacher adapts, dials back or deepens the objectives and tasks for the specific needs of their class.

Long term:

- Yearly Overview based on year group objectives taken from the National Curriculum Progression Maps and Development Matters

Medium term:

- Half Term Overviews outlining the topics for areas that will be covered

Short term:

- Daily lessons include a clear lesson intention 'Oli'
- Daily lessons are taught using the model boards
  -Retrieval, Checking for understanding (only for new topics), Learn together ('I Do'), Guided Practice ('We Do'), Independent Practice ('You Do'), Mastery and Greater Depth
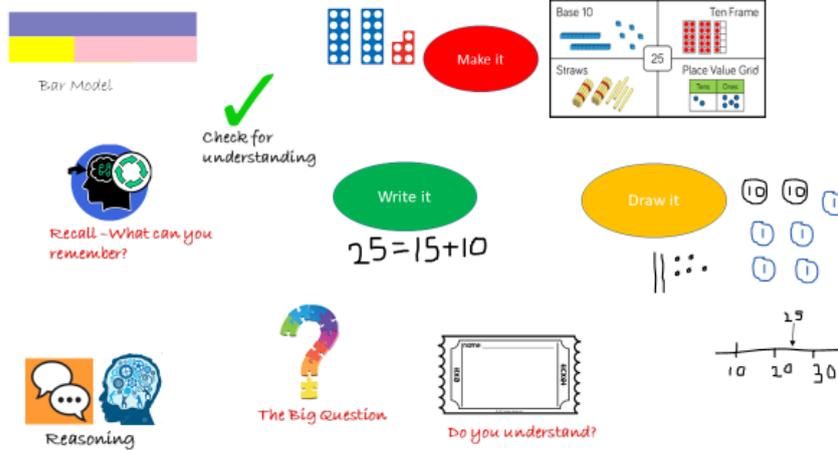
Learn Together – I do
Date: 12.02.2022
Oli: I can......

Give an example of what you want them to do.

What is the strategy they need to use to be successful?

Vocabulary

1	5	+	1	5	=	
1	0	+	1	0	=	
	5	+		5	=	
2	0	+	1	0	=	

Guided Practice – We Do

Modelled examples
Find a mistake
What a good one looks like

What went wrong here?

1	5	+	1	6	=
2	1	+	1 1		=

My answer is 32

Vocabulary

Independent Practice – You do
Fast finishers/ quick graspers

This is the lower level/simpler version of the concept you want them to learn. For example:
30+12=
Here you are learning to add tens and ones. The ones column has a 0 so its one less step

This is the level of what you want them to learn
For example:
25+52=
Here you are adding both the ones together and the tens so there is a bit more for partitioning

This is the extended challenging level
For example:
25+59=
Here there is carrying and crossing the tens barrier

Vocabulary

Short term planning is supported by the use of:

- White Rose Maths Hub materials
- NCETM Progression Maps
- Numicon Handbooks(Y1-Y6)
- Timestable Rockstars

Teaching 'Quality first teaching' linked to teaching standards:

All teachers:

- 'Know where their children are' through the use of concise summative assessment, prior learning, assessment, maths talk
- 'Understand where their children need to be' through a secure understanding of year group expectations and/or pre key stage expectations and incisive, ongoing, formative assessment
- 'Know how they are going to get them there' through the use of a range of strategies to promote independence, mastery and high expectations of ALL.
- Plan for progression during and between lessons.

Plans and books are monitored by the SLT are monitored by the SLT on a half-termly basis. Key questions consideredas part of monitoring are:
- Is there evidence of plans being adapted for the class?
- Is it clear what the aims are for each week/lesson/unit of work ('by the end of this lesson (s) the children will beable to....')?
- Are these plans live working documents?

Assessment

Each child's progress should be continually assessed and should inform day to day planning.

We assess by:

- Formative assessment strategies: 'Can You Still…' Focused questioning, explanations of thinking, Next Steps
- Using our subject knowledge and experience to anticipate and teach away from misconceptions;
- Fast feedback or On The Spot marking or verbal feedback.
- Target Tracker- highlighting the National Curriculum statements – which are linked turned into the Learning intentions/ I can statements used every lesson.
- At the end of Year 2 and 6 the children sit standard assessment tasks (SATs). These are marked internally in Year 2and externally in Year 6.
- Summative/reported- Inspire Maths Standardisation (Y1-Y6)
- Summative/diagnostic – White Rose, Test Base, NCETM, Check for understanding model board, retrieval grid model board
- Prior and Post learning – informs future planning, demonstrates progress in books, celebrates effort and achievement.

SLT are able to track the progress across the school every half term through Target Tracker. Through interpreting this data which is viewed as a whole class, age related as well as individualised targets, Teachers will have a better understanding of which topic areas require further consolidation to inform future planning.

Teaching for Mastery at The Willows

What we do?	Why are we doing it?	What does it look like in practice?
1. Whenever appropriate, we use **real-life examples** as a context for learning.	• Supports pupils to see Maths as relevant to their own lives now and in the future. • Children are given opportunities to discuss and share their experience to develop their understanding further.	• Where appropriate, we make cross-curricular links between Maths and other subjects such as IPC. • Displays link on learning wall to a real-life context, where appropriate.
2. We plan sequences of lessons using **central resources**: NCETM website and White Rose.	• Methods used are consistent across KS1 and KS2 • There is a clear focus on building concepts using a CPA approach and the use of resources. • There is a clear focus on using precise mathematical language alongside appropriate representations of concepts. • Vocabulary is always available • A secure understanding of number and place value is the core of all teaching.	• Curriculum coverage is flexible and led by the understanding of the pupils. • Weekly plans are amended where appropriate to address the misconceptions presented in main class teaching.
3. We teach using a **CPA** (Concrete, Pictorial, Abstract) approach.	• Use of concrete resources is a foundation for conceptual understanding. • Pupils learn to use pictures and diagrams to represent concepts, their thinking and their working through problems. • As a result of their work with concrete resources and pictures, pupils have a better understanding of using notation and symbols to represent concepts and solve problems. • Visualisation is developed through the use of concrete resources to support the pictorial and abstract approaches. • Children need a range of representations at all stages of their understanding to ensure that is secure (fluency, reasoning and problem solving)	• Resources trays are used in everyday teaching where possible. • Children have concrete objects to support with their learning. • Teachers systematically model building concepts using a CPA approach through their teaching. • A range of resources are readily available and pupils are well practiced at using them appropriately. • Sometimes pupils choose which resource would be suitable for building a concept and working through a task. • Pupils record their thinking and methods using pictures and diagrams (representations). • Pupils are encouraged to prove their understanding by demonstrating different representations of the strategies – concretely, pictorially or abstract.

4. Pupils are **not grouped by ability**.	• Mixed ability teaching is inclusive. • Pupils are not given the message that there is a 'ceiling' put on their ability to achieve. • Encourages a growth mindset. • Teachers are challenged to manage personalised learning effectively.	• Seating plans are mixed ability. • Pupils are taught through whole-class interactive teaching, where the focus is on all pupils working together on the same lesson content at the same time. • Pupils discuss their Maths learning and sometimes work collaboratively in mixed ability groups and pairs. • Where pupils need more personalised support to grasp a concept or method, intervention within the lesson and sometimes outside of it, ensures that they are ready to move forward with the rest of the class.
5. We teach mental Maths strategies daily.	• Number and place value are embedded to develop secure foundations of understanding the other mathematical domains. • Supports children speed of being able to calculate.	• Children knowledge of number is built upon through a range of algorithms presented to them. • Retreval grids are used to support retention and processing into long term memory. • Pictorial representations are used to as visuals to practice arithmetic daily. • Interactive games as used as tools to practice mental calculations.
6. We provide ample opportunities for practice and consolidation of skills taught.	• Children understanding need to be secure of concepts being taught before progression can take place. • Practice shows progress of the children in your class • Misconceptions can be addressed	• CPA approaches are used to create activities where children can develop their understanding. • Modelled boards allow for consistency in delivery so that students are able to understand the content rather than having to adapt their understanding of different teaching styles. • Check for understanding grid allows for the differing levels of pitch to be verified. • Misconceptions are addressed through 'I Do', 'We Do' model boards as well as small group support.
7. We follow the calculation policy.	• Children ensure a depth of progression of skills and coverage during main teaching. • To provide a framework for our families to actively use when engaging in their child learning. • To ensure pitch of planning and lessons is appropriate for each year group.	• Calculation policy is referred to in planning. • CT have a clear structure of skills that need to be taught and how to teach them.

Key stage 1 – Years 1 and 2: What do we teach at The Willows School Academy Trust?

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and thefour operations, including with practical resources [for example, concrete objects and measuring tools].

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare differentquantities such as length, mass, capacity/volume, time and money.

By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding placevalue. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage.

Year 1

Year 1, Statutory requirements: number and place value

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

Year 1, Statutory requirements: addition and subtraction

Pupils should be taught to:
- 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
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations,and missing number problems such as $7 = - 9$.

Year 1, Statutory requirements: multiplication and division

Pupils should be taught to:
- 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.

Year 1, Statutory requirements: fractions

Pupils should be taught to:
- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

Year 1, Statutory requirements: measurement

Pupils should be taught to:
- 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.

Year 1, Statutory requirements: geometry - properties of shape

Pupils should be taught to:
-   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].

Year 1, Statutory requirements: geometry position and direction

Pupils should be taught to:
-   describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Year 2

Year 2, Statutory requirements: number and place value

Pupils should be taught to:
-   count in steps of 2, 3, 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.

Year 2, Statutory requirements: addition and subtraction

Pupils should be taught to:
-   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 numbers using concrete objects, pictorial representations, and mentally, including:
-   a two-digit number and ones
-   a two-digit number and tens
-   two two-digit numbers
-   adding three one-digit numbers
-   show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
-   recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Year 2, Statutory requirements: multiplication and division

Pupils should be taught to:
-   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.

Year 2, Statutory requirements: fractions

Pupils should be taught to:
- recognise, find, name and write fractions 1/3, ¼, 2/4, ¾ of a length, shape, set of objects or quantity
- write simple fractions for example, ½ of 6 = 3 and recognise the equivalence of 2/4 and ½

Year 2, Statutory requirements: measurement

Pupils should be taught to:
- 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
- compare and order lengths, mass, volume/capacity and record the results using >, < and =
- 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 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.

Year 2, Statutory requirements: geometry - properties of shape

Pupils should be taught to:
- identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line
- identify and describe the properties of 3-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.

Year 2, Statutory requirements: geometry position and direction

Pupils should be taught to:
- order and arrange combinations of mathematical objects in patterns and sequences
- 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).

Year 2, Statutory requirements: statistics

Pupils should be taught to:
- 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.

Lower Key Stage 2 – Years 3 and 4: What do we teach at The Willows School Academy Trust?

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasinglylarge whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematicalreasoning so they can analyse shapes and their properties, and confidently describe the relationships between them.

It should ensure that they can use measuring instruments with accuracy and make connections between measure andnumber.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the12 multiplication table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word readingknowledge and their knowledge of spelling.

Year 3

Year 3, Statutory requirements: Number – number and place value

Pupils should be taught to:
- 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.

Year 3, Statutory requirements – addition and subtraction

Pupils should be taught to:
- 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 andsubtraction
- 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 additionand subtraction.

Year 3, Statutory requirements: multiplication and division

Pupils should be taught to:
- 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 thatthey 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 positiveinteger scaling problems and correspondence problems in which n objects are connected to m objects.

Year 3, Statutory requirements: fractions

Pupils should be taught to:
- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and individing 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 smalldenominators
- 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
- solve problems that involve all of the above.

Year 3, Statutory requirements: measurement

Pupils should be taught to:
- 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 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
- 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].

Year 3, Statutory requirements: geometry - properties of shape

Pupils should be taught to:
- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientationsand 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 andfour 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.

Year3, Statutory requirements: statistics

Pupils should be taught to:
- 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?'] usinginformation presented in scaled bar charts and pictograms and tables.

Year 4

Year4, Statutory requirements: number and place value

Pupils should be taught to
- 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 theconcept of zero and place value.

Year4, Statutory requirements: addition and subtraction

Pupils should be taught to:
- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition andsubtraction 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 andwhy.

Year 4, Statutory requirements: multiplication and division

Pupils should be taught to:
- recall multiplication and division facts for multiplication tables up to 12 × 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 numbersby one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Year 4, Statutory requirements: fractions and decimals

Pupils should be taught to:
- 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 anddividing 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
- 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 ½, 1/4/ ¾
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in theanswer as ones, tenths and hundredths
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to two decimal places
- solve simple measure and money problems involving fractions and decimals to two decimal places.

Year 4, Statutory requirements: measurements

Pupils should be taught to:
- Convert between different units of measure [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres
- find the area of rectilinear shapes by counting squares
- estimate, compare and calculate different measures, including money in pounds and pence
- read, write and convert time between analogue and digital 12- and 24-hour clocks
- solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

Year 4, Statutory requirements: geometry - properties of shape

Pupils should be taught to:
- 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.

Year 4, Statutory requirements: geometry position and direction

Pupils should be taught to:
- 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.

Year 4, Statutory requirements: statistics

Pupils should be taught to:
- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts andtime graphs.
- -solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables andother graphs.

Upper Key Stage 2 – Years 5 and 6: What do we teach at The Willows School Academy Trust?

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understandingof the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety ofproblems.

Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching shouldalso ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplicationand division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

Year 5

Year 5, Statutory requirements: number and place value

Pupils should be taught to:
- 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, 100, 1000, 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.

Year 5, Statutory requirements: addition and subtraction

Pupils should be taught to:
- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnaraddition 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
-   solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to useand why.

Year 5, Statutory requirements: multiplication and division

Pupils should be taught to:
-   identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
-   know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
-   establish whether a number up to 100 is prime and recall prime numbers up to 19
-   multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including longmultiplication 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 andinterpret remainders appropriately for the context
-   multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
-   recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
-   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, includingunderstanding the meaning of the equals sign
-   solve problems involving multiplication and division, including scaling by simple fractions and problems involvingsimple rates.

Year 5, Statutory requirements: fractions including decimals and percentages

Pupils should be taught to:
-   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 andhundredths
-   recognise mixed numbers and improper fractions and convert from one form to the other and write mathematicalstatements > 1 as a mixed number [for example, $2/5 + 4/5 = 6/5 = 1 1/5$
-   add and subtract fractions with the same denominator and denominators that are multiples of the same number
-   multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
-   read and write decimal numbers as fractions [for example, $0.71 = 71/100$
-   recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
-   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
-   recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', andwrite percentages as a fraction with denominator 100, and as a decimal
-   solve problems which require knowing percentage and decimal equivalents of 1/2 , ¼, 1/5, 2/5, 4/5 and thosefractions with a denominator of a multiple of 10 or 25.

Year 5, Statutory requirements: measurement

Pupils should be taught to:
-   convert between different units of metric measure (for example, kilometre and metre; centimetre and metre;centimetre and millimetre; gram and kilogram; litre and millilitre)
-   understand and use approximate equivalences 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, squarecentimetres (cm2) and square metres (m2) and estimate the area of irregular shapes
-   estimate volume [for example, using 1 cm3 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] usingdecimal notation, including scaling.

Year 5, Statutory requirements: geometry – properties of shape

Pupils should be taught to:
- identify 3-D shapes, including cubes and other cuboids, from 2-D representations
- know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- draw given angles, and measure them in degrees (o)
- identify: angles at a point and one whole turn (total 360°), angles at a point on a straight line and ½ a turn (total180°); other multiples of 90°
- 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.

Year 5, Statutory requirements: geometry – position and direction

Pupils should be taught to:
- identify, describe and represent the position of a shape following a reflection or translation, using the appropriatelanguage, and know that the shape has not changed.

Year 5, Statutory requirements: statistics

Pupils should be taught to:
- solve comparison, sum and difference problems using information presented in a line graph
- complete, read and interpret information in tables, including timetables.

Year 6

Year 6, Statutory requirements: number and place value

Pupils should be taught to:
- 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 and practical problems that involve all of the above.

Year 6, Statutory requirements: addition, subtraction, multiplication and division

Pupils should be taught to:
- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of longmultiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, andinterpret 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 whereappropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- 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 useand 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 appropriatedegree of accuracy.

Year 6, Statutory requirements: fractions including decimals and percentages

Pupils should be taught to:
- 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 equivalentfractions

- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ x ½ = 1/8]
- divide proper fractions by whole numbers [for example, 1/3 ÷ 2 =1/6
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simplefraction [for example, 3/8]
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10,100 and 1000 giving answers up to three decimal places
- multiply one-digit numbers with up to two decimal places by whole numbers
- use written division methods in cases where the answer has up to two decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Year 6, Statutory requirements: ratio and proportion

Pupils should be taught to:
- solve problems involving the relative sizes of two quantities where missing values can be found by using integermultiplication and division facts
- solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] andthe 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.
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Year 6, Statutory requirements: algebra

Pupils should be taught to:
- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with two unknowns
- enumerate possibilities of combinations of two variables.
-

Year 6, Statutory requirements: measurement

Pupils should be taught to:
- solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
- use, read, write and convert between standard units, converting measurements of length, mass, volume and timefrom a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- convert between miles and kilometres
- recognise that shapes with the same areas can have different perimeters and vice versa
- recognise when it is possible to use 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(cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].

Year 6, Statutory requirements: geometry – properties of shape

Pupils should be taught to:
- 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 anytriangles, quadrilaterals, and regular polygons
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter istwice the radius
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missingangles.

Year 6, Statutory requirements: geometry – position and direction

Pupils should be taught to:
- 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.

Year 6, Statutory requirements: statistics

Pupils should be taught to:
- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average.

Head Teacher
Malcolm Shaw
Signed: September 2024

Curriculum Lead
Sarita Powell
Signed: September 2024