Knights Templar Community Church School and Nursery

Work at it with all your heart

Maths

(subject progression)

Intent, Implementation and Impact

Knights Templar Community Church School and Nursery

Curriculum Area: Maths

Intent

At Knights Templar Community Church School we believe that Maths is a chance to actively problem solve, find success and build resilience. We want our learners to feel that making mistakes is part of the process of learning and to use that to be creative with number. Our intent is to provide learners with a number rich environment in which they wish to experiment and explore.

We will use a mastery approach to our teaching and learning of Mathematics. Our mathematical curriculum intends to build concepts in small logical steps that develops and deepens learners' understanding whilst building procedural fluency and conceptual knowledge. It helps them to understand how Maths is in our everyday life and prepares them for the future and the world of work. We intend to ensure students make exceptional progress and attainment.

Whilst Mathematical skills and knowledge are organised into distinct domains, our aim is to actively promote rich connections within other subjects though curriculum.

Our mathematical aims are to ensure that:

- we have a consistent approach to planning that effectively implements the mastery approach
  - to use the same planning format to enable a consistent approach across the school
  - for all learners to have a 60 minute maths lesson followed by 20 min separate Fluency Lesson
- we develop the three key aims of the curriculum – fluency, arithmetic and particularly reasoning
  - teachers to use assessment to pick up on misconceptions, insufficient skills and lack of conceptual knowledge in Number. Intervention to be held on the same day or as quickly as possible
  - teachers to have a solid understanding of subject knowledge to ensure they understand the key progressions skills for learners.
- we create a number rich learning environment for all classes including Nursery

- every classroom to have a dedicated Maths Working Wall, including Nursery
- classrooms to be Number Rich learning environments with resources to be labelled and modelled by teachers and Key Workers

- marking will be consistent and support learners' thinking.
  - all teachers to give learners dedicated time to respond to marking. This needs to be completed before the next maths lesson.
  - to have a consistent marking policy that gives clear feedback to learners.
- we develop a depth of understanding to particularly challenge more able learners.
  - learners to understand what their current attainment is and how to improve by looking and focusing on their targets.
  - higher ability learners need to be pushed to achieve Greater Depth in Mathematics.
- presentation to be consistent and good across all classes.
  - to have clear non-negotiables for each year group.
  - learners to take pride in the presentation and quality of their work.

Implementation

Maths in Early Years Foundation Stage and Nursery

Planning

Reception are following long/ half term planning that was devised with an EY maths consultant working through the WSOA. This is enhanced with ideas discussed and shared when our EY lead was part of the Somerset Boolean Early Years Maths working party. Nursery and pre-school have also embedded ideas from this work into their weekly plans.

Learners entering nursery (0-2yrs), pre-school (3-4yrs) and the Reception class (4-5yrs) will be assessed against the EYFS areas of learning. Within six weeks of the child starting, they will be given a 'baseline' assessment.

Formative Assessment

Throughout the year, learners are monitored on their progress in all areas of development including Number and Numerical Pattern. Examples of learners' learning, showing their individual level and stage of development are evidenced and kept by the Early Years Lead.

Progress is recorded by observing and assessing learners and using the Early Years Foundation Stage Framework.

Assessment Cycle

Baseline – within six weeks of the child joining the setting.

Termly – progress against the Mathematical strand of the EYFS Framework: Number and Numerical Patterns.

Summative Data

At the end of Foundation Stage, all learners will be assessed against the EYFS Profile Early Learning Goals. This will state if they are working at:

- Did not achieve Expected Level of Development
- Achieved Expected Level of Development
- Exceeded Expected Level of Development

In addition, there will be a written commentary on each child's learning in relation to the characteristics of effective learning.

Planning

From September 2019, Knights Templar Community Church School adopted a structured approach to our maths planning. We specifically use resources from White Rose Premium. This is to ensure that we use the small steps to embed conceptual understanding for all learners. We also have a calculation policy that was devised with a Maths consultant and Maths Leads from across West Somerset as part of the West Somerset Opportunity Area.

Long-Term Planning

The Long-Term Plan for Maths at Knights Templar Community Church School is taken directly from White Rose Hub Programme. It sets out when and where each unit will be taught in each year group (including mixed age classes.)

Medium-Term Plan

The White Rose Hub sets out which aspects of maths are to be taught in a termly sequence of blocks (units of work.) Each term is supported by a sequence of 'small steps' which sets out the teaching sequence for each unit and other relevant support materials from a variation of resources (where appropriate) such as 'I See Reasoning' and 'Arithmekits.'

Short-Term Planning

All maths lessons will consist of a 45-minute maths lesson and 15-minute additional fluency lesson. The maths lesson may be together or separate according to how teachers plan their days.

All staff at Knights Templar Community Church School use the newly adopted six-part lesson plan format. This includes a Teacher Input – Fluency – Reasoning – Problem Solving – Greater Depth Challenge – Plenary. The Teacher Input should include an anchor question to teach and model the skills needed for the lesson. Fluency, Reasoning, Problem Solving should include guided work and independent work. Knights Templar Community Church School's short term planning also embeds the use of a range of methods such as The Bar Model, Part-Part-Whole and the use of Concrete, Pictorial and Abstract (C.P.A.) methods. Lesson content is supported by the use of appropriate manipulatives and resources (such as White Rose). All maths lessons must include a clear Learning Objective that is thoroughly explained and referred to throughout the lesson by the teacher. Every Maths book will have a clear date and learning objective for every new learning objective taught.

Differentiation

The expectation is that the majority of pupils will move through a Maths Lesson/ Unit of Work/ Curriculum at broadly the same pace. For all learners to have a thorough conceptual understanding of the different areas in maths our teaching at Knights Templar Community Church School revolves around moving learners from Concrete Materials, to Pictorial representations, to Abstract Symbols/Representations (C.P.A).

Differentiation is provided to all learners through the level of questions within the teacher part and guided part of the lesson, through the resources or manipulatives that learners may use and the classroom support they have (e.g. Teaching Assistants). In some cases learners may be taught in specific groups or individually as necessary in order for the learners to make the accelerated progress they may need to catch up.

It is expected that learners who grasp concepts rapidly are challenged to explore mathematical concepts by broadening their understanding before accelerating through new content. Learners are encouraged to think more deeply about the mathematical concepts through the use of rich discussions and mathematical language.

For learners who are not sufficiently fluent with a concept, they will have rapid intervention on the same day or as quickly as possible in order to consolidate understanding. This is to ensure that learners 'Keep Up' rather than 'Catch Up'.

All learners will be exposed to Problem Solving and Reasoning questions through the teaching sequence.

Assessment

Learners are assessed against the New National Curriculum Objectives and expectations for their Year Group. Each Year Groups Expectations are:

- Emerging (E) – Working Below Age Related Expectation
- Developing (D) – Working Towards Age Related Expectation
- Secure (S) – Working At Age Related Expectation
- Greater Depth (M) – Woking Beyond Age Related Expectation

On-going assessments are recorded on SIMs where staff input Teacher Assessments on a half termly basis. These assessments are informed by White Rose end of unit assessments, end of term White Rose assessments, NFER assessments and independent work.
End of year targets are set for each child based on information gathered from the Family Fischer Trust (FFT).

Statutory Assessment

In May, all Year 2 learners will sit a Mathematics Test (Key Stage 1 SAT). This test is to be marked by class teachers and used to support their existing knowledge of the child's attainment level. An overall attainment level is reported to parents as a 'Teacher Assessment.'

From the 2021/22 academic year onwards, Year 4 have been required to take an online Multiplication Tables Check (MTC) in June based on their recall of the multiplication tables up to and including 12 x 12. This test helps identify learners who have not mastered their times tables. This informs the child's next school if extra support is needed.

Assessment for Learning

Teachers will:

- carry out continuous assessment
- use White Rose end of unit assessments
- use White Rose end of term assessments
- use NFER end of year tests
- administer Statutory Assessment Tests in Year 2
- administer MTC in Year 4
- inform parents and carers of their child's progress and targets.

Monitoring

Monitoring of the standards of learners' work and the quality of teaching is the responsibility of the Subject Lead and the Senior Leadership Team including Head Teacher, Deputy Head Teacher, Early Years Lead, Key Stage 1 and Key Stage 2 Leads.

Teaching and Progress is monitored at least half termly but more frequently if necessary. This involves:

- tracking and data analysis by SLT and Maths Lead through SIMs
- lesson observations
- learning walks
- book scrutiny
- pupil progress meetings
- curriculum portfolios

Special Educational Needs

All learners that have identified Special Educational Needs will have access to all subjects in the National Curriculum. Teachers will plan lessons that have no barriers to pupils achieving with appropriate targets for every child to make progress in Mathematics.

Learners in need of intervention will receive this either by the Teacher/Teaching Assistant as soon as possible after the lesson or by using the Number Stacks program that is implemented by trained Teaching Assistants.

Assessment for Learning

Teachers will:

- carry out continuous assessment
- use assessment judgements made during lesson time to adjust future planning
- make comments in pupil's books related to the learning objective
- carryout end of unit assessments to identify gaps in knowledge
- complete half termly assessments to track progress of learners.
- complete formal end of term assessments to track progress of learners
- administer national tests and assessments in Year 2 (SAT) and Year 4 (times tables)

- inform parents and carers of their child's progress and targets.

Contribution of Mathematics in Other Areas of the Curriculum

Mathematics contributes to many subjects within the primary curriculum and opportunities will be sought to draw mathematical experiences from a wide range of activities. This will allow learners to begin to use and apply mathematics in real contexts.

Resources

Knights Templar Community Church School is thoroughly resourced through the West Somerset Opportunity Area. Resources are readily available to support learners' learning and understanding. Resources will be upgraded and replenished as the need arises. An annual audit will be taken by the subject lead in the summer term in preparation for the next academic year.

Training and Continuing Professional Development

At Knights Templar Community Church School, CPD for Mathematics will be provided every Half Term. Additional training will be provided as necessary.

Impact

The impact will be seen across the school with an increase in the profile of Maths. By the end of their time at Knights Templar, our young Mathematicians will be:

- **Confident individuals** who are fluent in key mathematical facts, can confidently use the concrete, pictorial, abstract method to show understanding and progression of learning and can use and understand Mathematical vocabulary.
- **Successful learners** who want to continue building on their wealth of knowledge and understanding, now and in the future and can use manipulatives as a means to demonstrate understanding as opposed to being needed to complete their work.
- **Responsible citizens** who can reason and problem-solve in a wide range of contexts.

Statutory Expectations:

Early Years Foundation Stage Framework:			
ELG	Mathematics	Number	• Have a deep understanding of number to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5. • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.
		Numerical Patterns	• Verbally count beyond 20, recognising the pattern of the counting system. • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally

National Curriculum Expectations:	
KS1	**Year 1 pupil 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 the language of: equal to, more than, less than (fewer), most, least • read and write numbers from 1 to 20 in numerals and words • read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • represent and use number bonds and related subtraction facts within 20 • add and subtract one-digit and two-digit numbers to 20, including zero • solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9. solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher • recognise, find and name a half as 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 • compare, describe and solve practical problems for: - lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] - mass/weight [for example, heavy/light, heavier than, lighter than] - capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] - time [for example, quicker, slower, earlier, later] • measure and begin to record the following: - lengths and heights - mass/weight - capacity and volume - time (hours, minutes, seconds) • recognise and know the value of different denominations of coins and notes • sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] • recognise and use language relating to dates, including days of the week, weeks, months and years • tell the time to the hour and half past the hour and draw the hands on a clock face to show these times • recognise and name common 2-D and 3-D shapes, including:

- 2-D shapes [for example, rectangles (including squares), circles and triangles
- 3-D shapes [for example, cuboids (including cubes), pyramids and spheres

- describe position, direction and movement, including whole, half, quarter and three-quarter turns

Year 2, 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
- 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
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts
- recognise, find, name and write fractions 1/3, ¼ , 2/4 and 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
- 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 • 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 • 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). • 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
KS2	**Year 3, 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 • add and subtract numbers mentally, including: - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds • add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction • estimate the answer to a calculation and use inverse operations to check answers

- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction
- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects
- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- 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, 7 5 + 7 1 = 7 6]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.
- 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].
- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- recognise angles as a property of shape or a description of a turn
- identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines.
- interpret and present data using bar charts, pictograms and tables
- solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables

Year 4 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 the concept of zero and place value
- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why
- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects
- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- 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 ¼ , ½ , ¾
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- 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
- 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
- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- identify acute and obtuse angles and compare and order angles up to two right angles by size
- identify lines of symmetry in 2-D shapes presented in different orientations
- complete a simple symmetric figure with respect to a specific line of symmetry
- describe positions on a 2-D grid as coordinates in the first quadrant
- describe movements between positions as translations of a given unit to the left/right and up/down
- plot specified points and draw sides to complete a given polygon
- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Knights Templar Community Church School and Nursery

Progression Map of Mathematical Skills and Knowledge

"Maths gives us every reason to hope that every problem has a solution."

Number: Number and Place Value

Key Skills Progression		
Reception	Year 1	Year 2
Counting		
Count reliably with numbers to 20 and place them in order.	Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number	
Count irregular amounts of objects	Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	Count in steps of 2,3 and 5 from 0 and in tens from any number, forwards and backwards
Can say which number is one more or one less than a given number	Given a number, identify one more and one less	
Comparing Numbers		
Use the language 'more' and 'fewer' to compare to sets of objects.	Use the language of: equal to, more than, less than (fewer), most, least	Compare and order numbers from 0 up to 100; use <,> and = inequality signs
Identifying, representing and estimating numbers		
Select the correct numeral to represent numbers to 20.	Identify and represent numbers using objects and pictorial representations including the number line	Identify, represent and estimate numbers using different representations, including the number line

Estimate how many objects they can see and check by counting		
Reading and writing numbers		
	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
Understanding place value		
	Recognise the place value of each digit in a two-digit number (tens, ones)	Recognise the place value of each digit in a two-digit number (tens, ones)
Problem Solving		
Begin to identify own mathematical problems based on own interests and fascinations.	Use place value and number facts to solve problems	Use place value and number facts to solve problems
Greater Depth		
• Estimate a number of objects and check quantities by counting up to 20 • Solve practical problems that involve combining groups of 2, 5 or 10	• Count reliably beyond 100 • Count on and back in 3's from any given number to beyond 100 • Say the number that is ten more or ten less than a number to 100 • Know the < and > inequality signs	• Reason with numbers showing an understanding of place value

Year 3	Year 4	Year 5	Year 6
Counting			
	Count backwards through zero to include negative numbers	Interpret negative numbers in context, count forwards and backwards with positive and negative numbers, including through zero	Use negative numbers in context, and calculate intervals across zero
Count from 0 in multiples of 4, 8, 50 and 100	Count in multiples of 6, 7, 9, 25 and 1,000	Count forwards and backwards in steps of powers of 10 for any given number up to 1,000,000	
Find 10 or 100 more or less than a given number	Find 1,000 more or less than a given number		
Comparing numbers			
Compare and order numbers up to 1,000	Order and compare numbers beyond 1,000	Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit (appears also in Reading and Writing Numbers)	Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit (appears also in Reading and Writing Numbers)
	Compare numbers with the same number of decimal places up to two decimal places		
Identifying, representing and estimating numbers			
Identify, represent and estimate numbers using different representations	Identify, represent and estimate numbers using different representations		
Reading and writing numbers (including Roman Numerals)			

Read and write numbers to 1,000 in numerals and in words		Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit	Read, write and compare numbers up to 10,000,000 and determine the value of each digit (appears also in Understanding Place Value)
Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour cloaks (appears also in Measurement)	Read Roman numerals to 100 (I to C) and know that over time, the numerals system changed to include the concept of zero and place value	Read Roman numerals to 1,000 (M) and recognise years written in Roman numerals	
Understanding place Value			
Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	Recognise the place value of each digit in a four-digit number (thousands, hundred, tens and ones)	Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit (appears also in Reading and Writing Numbers)	Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit (appears also in Reading and Writing Numbers)
	Find the effect of dividing a one or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths (appears also in Fractions)	Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents (appears also in Fractions)	Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1,000 where the answers are up to three decimal places (appears also in Fractions)
Rounding			
	Round any numbers to the nearest 10, 100 or 1,000	Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000, 100,000	Round any whole number to a required degree of accuracy

	Round decimals with one decimal place to the nearest whole number (appears also from Fraction)	Round decimals with to decimal places to the nearest whole number and to one decimal place (appears also in Fractions)	Solve problems which require answers to be rounded to specified degree of accuracy (appears also in Fraction)
Problem Solving			
Solve number problems and practical problems	Solve number and practical problems that involve all of the above and with increasingly large positive numbers	Solve number problems and practical problems that involve all of the above	Solve number and practical problems that involve all of the above
Greater Depth			
Recognise the value of each digit in a four-digit number and the value of a tenth Begin to have an understanding about negative numbers, recognising they are smaller than 0	Round any number to 100,000 to the nearest 10, 100, 1,000 or 10,000 Use tenths, hundredths and thousands when comparing values	Have a concept of numbers well beyond 1,000,000 and their relative association to distances to plants, historical data and geographical aspects. Use rounding as a strategy for quickly assessing what approximate answers ought to be, before calculating Link working across 0 for positive and negative numbers to work time between BC and AD in history	Use the symbols $=, \neq, \leq, \geq$ correctly

Number: Addition and Subtraction

Key Skills Progression		
Reception	Year 1	Year 2
Number bonds		
	Represent and use number bonds and related subtraction facts within 20	Recall and use addition and subtraction facts to 20 fluently and derive and use related facts up to 100
Metal Calculation		
Find the total number of items in two groups by counting all of them	Add and subtract one-digit and two-digit numbers to 20, including zero	Add and subtract numbers using concrete objects, pictorial representations, and mentally including: - A two-digit number and ones - A two-digit number and tens - Two two-digit numbers
In practical activities and discussion, begin to use the vocabulary involved in adding and subtracting	Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods)	Adding three one-digit numbers
Add and subtract two single digit numbers		Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
Count on or back to find the answer to addition and subtraction questions		
Inverse operations, estimating and checking answers		

		Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
Problem Solving		
	Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number problems such as: 7 = □ - 9	Solve problems with addition and subtraction: - Using concrete objects and pictorial representations, including those involving numbers, quantities and measures - Applying their increasing knowledge of mental and written methods - Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including in giving change (appears also in Measurement)
Greater Depth		
Solve practical problems that involve combining groups of 2, 5 or 10 or sharing into equal groups	Apply knowledge of number to solve a one-step problem involving addition and subtraction Add and subtract one-digit and two-digit numbers to 20, including 0	Use reasoning about numbers and relationships to solve complex problems and explain their thinking Solve unfamiliar word problems that involve more than one step

Year 3	Year 4	Year 5	Year 6
Metal Calculation			

add and subtract numbers mentally, including: -A three-digit numbers and ones - A three-digit number and tens - A three-digit numbers and hundreds		Add and subtract numbers mentally with increasingly large numbers	Perform mental calculations, including with mixed operations and large numbers
			Use their knowledge of the order of operations to carry out calculations involving the four operations
Written methods			
Add and subtract numbers with up to three digits, suing formal written methods of columnar addition and subtraction	Add and subtract numbers with up to 4 digits using the formal written method of columnar addition and subtraction where appropriate	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	
Inverse operation, estimating and checking answers			
Estimate the answers to a calculation and use inverse operations to check answers	Estimate and use inverse operations to check answers to a calculation	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
Problem Solving			
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 method to use and why	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

			Solve problems involving addition, subtraction, multiplication and division
Greater Depth			
Add and subtract numbers with any number of digits using formal written method	Use tenths, hundreds and thousandths when solving addition and subtraction problems Solve multi-step problems involving more than one of these operations	Calculate number problems algebraically for example: $2x - 3 = 5$	

Number: Multiplication and Division

Key Skills Progression		
Reception	Year 1	Year 2
Multiplication and division facts		
	Count in multiplies of twos, fives and tens (appears also in Number and Place Value)	Count in steps of 2, 3 and 5 from 0 and in tens from any number, forwards and backwards. (appears also in Number and Place Value)
		Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
Mental Calculation		
		Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
Written Calculations		

		Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs.
Problem Solving		
Solve problems, including doubling, halving and sharing	Solve one-step problems involving multiplications 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.
Greater Depth		
Solve practical problems that involve combining groups of 2, 5 or 10 or sharing into equal groups.	Apply knowledge of number to solve a one-step problem involving simple multiplication and division.	Recall and use multiplication and division facts for 2, 5 and 10 and make deductions outside known multiplication facts. Solve unfamiliar word problems that involve more than one step.

Year 3	Year 4	Year 5	Year 6
Multiplication and Division Facts			
Count from 0 in multiples of 4, 8, 50 and 100	Count in multiples of 6,7,9,25 and 100	Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000	

(appears also in Number and Place Value)	(appears also in Number and Place Value)	(appears also in Number and Place Value)	
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 x 12		
Mental Calculations			
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, suing mental and progressing to formal written methods (appears also in Written methods)	Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; multiplying together three numbers.	Multiply and divide numbers mentally drawing upon known facts.	Perform mental calculations, including with mixed operations and large numbers.
	Recognise and use factor pairs and commutativity in mental calculations (appears also in Properties of Number)	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	Associate a fraction with division and calculate decimal fractions equivalents (e.g. 0.375) for a simple fraction (e.g. ¾)
Written Calculation			
Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and	Multiply two-digit and three-digit numbers by one-digit number using formal written layout.	Multiply numbers up to 4 digits by a one or two-digit number using formal written method, including long multiplication for two-digit numbers.	Multiply multi-digit numbers up to 4-digits by a two-digit whole number using the formal written method of long multiplication.

progressing to formal written methods (appears also in Written Methods)			
		Divide numbers up to 4-dgits by one-digit number using the formal written method of short division and interpret remainders appropriately for the context.	Divide numbers up to 4-dgits by a two-digit whole number suing the formal written method of short division. Where appropriate for the context divide numbers up to 4-digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.
			Use written division methods in cases where the answer has up to two decimal places. (appears also in Fraction – including decimals)
Properties of number: Multiples, factors, primes, square and cube numbers			
	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	Identify common factors, common multiples and prime numbers

		Know and use the vocabulary of prime numbers, prime factors and composite (non-Prime) numbers	Use common factors to simplify fractions: use common multiples to express fractions in the same denomination (appears also in Fractions)
		Establish whether a number up to 100 is prime and recall prime numbers	Calculate, estimate and compare volume of cubes and cuboids suing standard units, including centimetres cubed (cm3) and cubic metres (m3), and extending to other units such as mm3 and km3 (appears also in measures)
		Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)	
Order of operations			
			Use their knowledge of the order of operations to carry out calculations involving the four operations
Inverse operations, estimating and checking answers			
Estimate the answer to a calculation and use inverse operations to check answers (appears also in Addition and Subtraction)	Estimate and use inverse operations to check answers to calculations (Appears also in Addition and Subtraction)		Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
Problem Solving			

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 distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects	Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.	Solve problems involving addition, subtraction, multiplication and division
		Solve problems involving addition, subtractions, multiplication and division and a combination of these, including understanding the meaning of the equals sign	Solve problems involving similar shapes where the scale factor is known or can be found (appears also in Ration and Proportion)
		Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	
Greater Depth			
Know all multiplication facts to 12x12 and be able to instantaneously answer questions such as how many 7's in 42. Multiply and divide any two-digit number by a single-digit number and have an understanding of remainder.	Solve multi-step problems involving more than one operation. Rapidly recall answers when multiplying and dividing a whole or decimal number by 10.	Divide whole numbers (up to 4 digits) by 2-digits numbers using preferred method. Recognise the symbol for square root and work out square roots for numbers up to 100.	Multiply all integers (using efficient written methods) including mixed numbers and negative numbers. Move beyond squared and cubed numbers to calculate problems such as Xx10n where n is positive

Number: Fractions (including decimals and percentages)

Key Skills Progression		
Reception	Year 1	Year 2
Counting in Fractional Steps		
		Pupils should count in fractions up to 20, starting from any number using ½ and 2/4 equivalence on the number line (Non Statutory Guidance)
Recognising Fractions		
Solve problems that involves halving	Recognise and name a half as one of two equal parts of an object, shape or quantity.	Recognise fractions e.g. ½ of 6 = 3 and recognise the equivalence of 2/4 and 1/2
Greater Depth		
		Find and compare fractions of amounts

Year 3	Year 4	Year 5	Year 5
Counting in Fractional Steps			
Count up and down in tenths	Count up and down in hundredths		
Recognising Fractions			
Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators	Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.	Recognise and use thousandths and relate them the tenths, hundredths and decimal equivalents (appears also in Equivalence)	
Recognise that that tenths arise from dividing an abject into ten equal parts and in dividing 1-digit numbers or quantities by 10.			

Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators			
Comparing Fractions			
Compare and order unit fractions, and fractions with the same denominators		Compare and order fractions whose denominators are all multiples of the same number	Compare and order fractions, including fractions>1
Comparing Decimals			
	Compare numbers with the same number of decimal places up to two decimal places	Read, write, order and compare numbers with up to three decimal places	Identify the value of each digit in numbers given to three decimal places
Rounding Including Decimals			
	Round decimals with one decimal place to the nearest whole number	Round decimals with two decimal places to the nearest whole number and to one decimal place	Solve problems which require answers to be rounded to specified degrees of accuracy
Equivalence (including fractions, decimals and percentages)			
Recognise and show, using diagrams, equivalent fractions with small denominators	Recognise and show, using diagrams, families of common equivalent fractions	Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	Use common factors to multiply fractions; use common multiples to express fractions in the same denomination
	Recognise and write decimal equivalents of any number of tenths or hundredths	Read and write decimal numbers as fractions (e.g. 0.71 = 71/100)	Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8)

	Recognise and write decimal equivalents to ¼ ½ ¾	Recognise and use thousandths and relate then to tenths, hundredths and decimal equivalents	Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
		Recognise the percent symbol (%) and understand that per cent relates to "number of parts per hundred" and write percentages as a fraction with denominator 100 as a decimal fraction	
Addition and Subtraction of Fractions			
Add and subtract fractions with the same denominator within one whole (e.g. 3/7 + 1/7 = 4/7)	Add and subtract fractions with the same denominator	Add and subtract fractions with the same denominator and multiples of the same number	Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
		Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number (e.g. 2/5 + 4/5 = 6/5)	
Multiplication and Division of Fractions			
		Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	Multiply simple pairs of proper fractions writing the answer in its simplest form (e.g.1/4 x ½ = 1/8)

			Multiply one-digit numbers with up to two decimal places by whole numbers
			Divide proper fractions by whole numbers (e.g. $^{1}/_{3} \div 2 = {}^{1}/_{6}$)
Multiplication and Division of Decimals			
	Find the effect of dividing one or two-digit numbers by 10 and 100, identify the value of the digits in the answer as ones, tenths and hundredths		Multiply one-digit numbers with up to two decimal places by whole numbers
			Multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
			Identify the value of each digit the three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
			Associate a fraction with division and calculate decimal fraction equivalent's 9e.g. 0.375) for a simple fraction (e.g. 3/5)
			Use written division methods in cases where the answer has up to two decimal places
Problem Solving			

Solve problems that involve all of the above	Solve problems involving increasingly harder fractions to calculate quantities and fractions to divide quantities, including non-unit fractions where the answer is a whole number	Solve problems involving numbers up to three decimal places	
	Solve simple measures and money problems involving fractions and decimals to two decimal places	Solve problems which require knowing percentages and decimal equivalents of ½ ¼ 1/5 2/5 4/5 and those with a denominator of a multiple of 25	
Greater Depth			
Can find fractional values (from ¼ to 1/10) of amounts up to 1000	Relates tenths and hundredths to fractional values Work out simple percentage values of whole numbers Compare and add fraction whose denominators are all multiples of the same number		Compare, order and convert between fractions and percentages in contexts

Ratio and Proportion

Key Skills Progression Statements only appear in Year 6 but should be connected to previous learning, particularly fractions and multiplication and division			
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
			Solve problems involving the calculation of percentages (for example, of measures an such as 15% of 360) and the use of percentages for comparison
			Solve problems involving similar shapes where the scale factor is known or can be found
			Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples
Greater Depth			
			Reason with numbers showing an understanding of ration and proportion

Measurement

Key Skills		
Reception	Year 1	Year 2
Comparing and Estimating		
Orders two or three items by length or height Order two items by weight or capacity Everyday language to talk about: – Size (e.g. long/short, longer/shorter. Tall/short) – Weight (e.g. heavy/light, heavier than, lighter than) – Capacity (e.g. full/empty, more than, less than, half, half full. quarter) – Position (e.g. behind, next to) – Distance – Time (e.g. quicker, slower, earlier, later) – money	Compare, describe and solve practical problems for: – Lengths and heights (e.g. long/short, longer/shorter, tall/short, double/half) – Mass/weight (e.g. heavy/light, heavier than, lighter than) – Capacity and volume (e.g. full/empty, more than, less than, half, half full, quarter) – Time (e.g. quicker, slower, earlier, later)	Compare and order lengths, mass, volume/capacity and record the results using >,< and =
Order and sequence familiar events	Sequence events in chronological order using language (e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon, evening)	Compare and sequence intervals of time
Measuring and Calculating		
Measure short periods of time in simple ways	Measure and begin to record the following: • Lengths/heights • Mass/weight • Capacity/volume	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

	• Time (hours, minutes, seconds)	appropriate unit, using rulers, scales, thermometers and measuring vessels
Everyday language to talk about: – money	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
		Find different combinations of coins that equal the same amount of money
		Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change
Telling the Time		
Everyday language to talk about – Time (e.g. quicker, slower, earlier, later)	Tell the time to the hour and half past and draw the hands on a clock face to show these times	Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times
	Recognise and use language relating to dates, including days of the week, weeks, months and years	Know the numbers of minutes in an hour and the number of hours in a day (appears also in Converting)
Converting		
		Know the numbers of minutes in an hour and the number of hours in a day (appears also in Telling the Time)
Greater Depth		
Estimate, measure, weigh and compare and order objects. Talk about properties, position and time	Recognise all coins and notes, and know their value. Use coins to pay for items bought up to £1.	Read scales where not all numbers on the scale are given and estimate points in between. Red the time on a clock to the nearest 5 minutes.

	Use knowledge of time to know when key periods of the day happen, for example, lunchtime, home time etc.	

Year 3	Year 4	Year 5	Year 6
Comparing and Estimating			
	Estimate, compare and calculate different measures, including money in pounds and pence (appears also in Measuring)	Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes (appears also in measuring)	Calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3
		Estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water)	
Compare durations of events, for example to calculate the time taken by particular events or tasks			
Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m/p.m, morning, afternoon, noon and midnight			

(appears also in Telling the Time)			
Measuring and Calculating			
Measure, compare, add and subtract: **Lengths** (m/cm/mm); **Mass** (kg/g); **Volume/capacity** (l/ml)	Estimate, compare and calculate **different measures**, including **money in pounds and pence** (appears also in Comparing)	Used all four operations to solve problems involving measuring (**e.g. length, mass, volume, money**) using decimal notation including scaling	Solve problems involving the calculation and conversion of **units of measure,** using decimal notation up to three decimal places where appropriate (appears also in in Converting)
Measure the **perimeter** of 2-D shapes	Measure and calculate the **perimeter** of a rectilinear figure (including squares) in centimetres and metres	Measure and calculate the **perimeter** of composite rectilinear shapes in centimetres and metres	Recognise that shapes with the same area can have different **perimeters** and vice versa
Add and subtract amounts of money to give change, using both £ and p in practical contexts			
	Find the area of rectilinear shapes by counting squares	Calculate and compare the area of squares and rectangles including using standard units, square centimetres (**cm**^{2}) and square metres (m^2) and estimate the area of irregular shapes Recognise and use square numbers and cube numbers, and the notation for squares (^{2}) and Cubed (^{3})	Calculate the area of parallelograms and triangles

		(appears also in Multiplication and division)	
			Calculate, estimate and compare volume if cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units (e.g. mm^3 and km^3)
			Recognise when it is possible to use formulae for area and volume of shapes
Telling the Time			
Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks	Read, write and convert between analogue and digital 12 and 24-hour clocks (appears also in Converting)		
Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m/p.m, morning, afternoon, noon and midnight (appears also in Comparing and Estimating)			

	Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Converting)	Solve problems involving converting between units of time	
Converting			
Know the number of seconds in a minute and the number of days in each month, year and leap year	Convert between different units of measure (e.g. kilometre to metre, hour to minute)	Convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
	Read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Telling the Time)	Solve problems involving converting between units of time	Solve problems involving calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate (appears also in Measuring and Calculating)
	Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Telling the Time)	Understand and use equivalences between metric units and common imperial units such as inches, pounds and pints	Convert between miles and kilometres
Greater Depth			

Use knowledge of number to solve problems related to money, time and measures. Can relate knowledge of time to problems related to timetables. Measure, compare, add and subtract more complex problems using common metric measures set out kg, g, kl, l, m, km	Use 24-hour timetable to find out times for a journey between various places. Use knowledge or perimeter to work out the perimeter of large areas around school using metres and centimetres.	Use knowledge of measurement to create plans of areas around school, such as classroom, field, play area etc. Relate imperial measures still used regularly in our society to their metric equivalent, e.g. miles to kilometres, pounds to kilograms Use a range of timetables to work out journey times on a fictional journey around the world, e.g. how long would it take to reach the rainforests in the Amazon.	Use formula for measuring the area of shape such as a cuboid and triangle to work out the area of an irregular shape in the school environment. Use four operations with mass, length, time, money and other measures, including with decimal quantities. Calculate costs and time involved to visit a destination in another part of the world.

Geometry: Properties of Shape

Key Skills		
Reception	Year 1	Year 2
Identifying shapes and their properties		
Use familiar objects and common shapes to create and recreate patterns and build models. Selects a particular named shape. Explore characteristics of everyday objects and shapes, and use mathematical language to describe them.	Recognise and name common 2D and 3D shapes, including: • 2D shapes (e.g. rectangles (including squares), circles and triangles) • 3D shapes (e.g. cuboids (including cubes), pyramids and spheres)	Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line

Beginning to use mathematical names for 'solid' 3D shapes and 'flat' 2D shapes, and mathematical terms to describe shapes.		
		Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces
		Identify 2D shapes on the surface of 3D shapes, (for example, a circle in a cylinder and a triangle on a pyramid)
Comparing and Classifying		
		Compare and sort common 2D and 3D shapes and everyday objects
Greater Depth		
Recognise and name a range of 2D and 3D shapes.	Recognise different 2D and 3D shapes in the environment	Describe similarities and differences of 2D and 3D shapes using their properties.

Year 3	Year 4	Year 5	Year 6
Identifying shapes and their properties			
	Identify lines of symmetry in 2D shapes presented in different orientations	Identify 3D shapes, including cubes and other cuboids, from 2D representations	Recognise, describe and build simple 3D shapes, including making nets (appears also in Drawing and Constructing)
			Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.

Drawing and Constructing			
Draw 2D shapes and make 3D shapes using modelling materials; recognise 3D shapes in different orientation and describe them	Complete a simple symmetric figure with respect to s a specific line of symmetry	Draw given angles, and measure them in degrees (°)	Draw 2D shapes using given dimensions and angles
			Recognise, describe and build simple 3D shapes, including making nets (appears also in shapes and their properties)
Comparing and Classifying			
	Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	Use the properties of rectangles to deduce related facts and find missing lengths and angles	Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
		Distinguish between regular and irregular polygons based on reasoning about equal sides and angles	
Angles			
Recognise angles as a property of shape or a description of a turn		Know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles	
Identify right angles, recognise that two right angles make a half-turn, three make a three-quarters turn and four make a complete turn;	Identify acute and obtuse angles and compare and order angles up to two right angles by size	Identify angles at a point and one whole turn (total 360°) Identify angles at a point on a straight line and ½ a turn (180°)	Recognise angles where they meet at a point, are on a straight line, or are vertical opposite, and find missing angles

identify whether angles are greater than or less than a right angle.		Identify other multiples of 90°	
Identify horizontal and vertical lines and pairs of perpendicular and parallel lines			
Greater Depth			
	Know that the total internal angles of a triangle measure 180° and can measure each	Recognise nets and show an understanding that they create 3D shapes. Solve problems involving angles	

Geometry: Position and Direction

Key Skills		
Reception	Year 1	Year 2
Position, direction and movement		
Everyday language to talk about: • Position (e.g. behind, next to)	Describe position, direction and movement, including half, quarter and three-quarter turns.	Use mathematical vocabulary to describe position, direction and movement including 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)
Pattern		
Recognise, create and describe patterns.		Order and arrange combinations of mathematical objects in patterns and sequences
Greater Depth		

	Give instructions using positional and directional language	

Year 3	Year 4	Year 5	Year 6
Position, direction and movement			
Recognise angles as a property of shape or a description of a turn	Describe positions on a 2D grid as coordinates in the first quadrant	Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed	Describe positions on the full coordinates grid (all four quadrants)
	Describe movements between positions as translations of a given unit to the left/right and up/down		Draw and translate simple shapes on the coordinate plane, and reflect then in the axes
	Plot specified points and draw sides to complete a given polygon		
Greater Depth			

Statistics

Key Skills		
Reception	Year 1	Year 2
Handling Data		
		Interpret and construct simple pictograms, tally charts, block diagrams and simple tables

		Ask and answers 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
Greater Depth		

Year 3	Year 4	Year 5	Year 6
Counting			
Interpret and present data sing 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
Solving Problems			
Solve one-step and two-step questions (e.g. 'How many more? And 'How many fewer?') using information presented in scaled bar charts, pictograms and tables.	Solve comparison, sum and difference problems suing 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
Greater Depth			
	Collect on data on a given project and present information in graphical formats of their choosing	Collect own data on a given project and present information in graphical formats of their choosing, charts, graphs and tables	Collect own data on a personal project and present information in formats of their choosing, charts, graphs and tables, and answer specific questions related to their research

Algebra

Key Skills		
Reception	Year 1	Year 2
Equations		
	Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = __ - 9 (appears also in Addition and Subtraction)	Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems (appears also in Addition and Subtraction)
	Represent and use number bonds and related subtraction facts within 20 (appears also in Addition and subtraction)	Recall and use addition and subtraction facts to 20 fluently and derive and use related facts up to 100 (appears also in Addition and subtraction)
Greater Depth		

Year 3	Year 4	Year 5	Year 6
Equations			
Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction (appears also in Addition and Subtraction)		Use the properties of rectangles to deduce related facts and find missing lengths and angles (appears also in Geometry: Properties of Shapes)	Express missing number problems algebraically
Solve problems, including missing number problems, involving multiplication and division,			Find pairs of numbers that satisfy number sentences involving two unknowns

including integer scaling (appears also in Multiplication and Division)			
			Enumerate all possibilities of combinations of two variables
Formulae			
	Perimeter can be expressed algebraically as 2(a+b) where a and be are the dimensions in the same unit		Use simple formulae
			Recognise when it is possible to use formulae for area and volume of shapes (appears also in Measurement)
Sequences			
			Generate and describe linear number sequences
Greater Depth			
		Calculate number problems algebraically for example 2x-3=5	Recognise an arithmetic progression and find the nth term. Move beyond squared and cubed numbers to calculate problems such as X x 10n is positive.

Mathematics Vocabulary Progression

Reception/EYFS	
Number and Place Value	Zero, number; one, two, three… to twenty and beyond, teens numbers, one, how many? count, count up, count down, count on, count back; count in ones, twos, fives, tens, same as, more, less, few, pattern, pair, digit, ones, tens, as many as, more, larger, bigger, greater, fewer, smaller, less, most, biggest, largest, greatest, one more, ten more, one less, ten less, compare, order, size; first, second, third…. Twentieth, last, last one but, before, after, next, between
Addition and Subtraction	Add, more, and, make, sum, total, altogether, double; one more, two more, ten more, how many more make…?, how many more is … than …?, take away, how many are left?, how many have gone?, one less, two less, ten less, how many fewer is… than…?, how much less is…? Difference between
Multiplication and Division	Sharing, doubling, halving, number patterns, equal group
Measure	Measure, size, compare, guess, estimate enough, not enough too much, too little too many, too few nearly, close to, about the same as just over, just under, metre length, height, width, depth long, short, tall high, low wide, narrow thick, thin longer, shorter, taller, higher … and so on longest, shortest, tallest, highest … and so on far, near, close, weigh, weighs, balances heavy, light heavier than, lighter than heaviest, lightest scales, full empty half full holds container, time days of the week, Monday, Tuesday … day, week birthday, holiday morning, afternoon, evening, night bedtime, dinner time, playtime today, yesterday, tomorrow before, after next, last now, soon, early, late quick, quicker, quickest, quickly slow, slower, slowest, slowly old, older, oldest new, newer, newest takes longer, takes less time hour, o'clock clock, watch, hands, money coin penny, pence, pound price, cost buy, sell spend, spent pay
Geometry (position and direction)	position over, under above, below top, bottom, side on, in outside, inside around in front, behind front, back beside, next to opposite apart between middle, edge corner direction left, right up, down forwards, backwards, sideways across next to, close, near, far along through to, from, towards, away from movement slide roll turn stretch, bend whole turn, half turn
Geometry (properties of shape)	shape, pattern flat curved, straight round hollow, solid sort make, build, draw size, bigger, larger, smaller symmetrical pattern, repeating pattern match, corner, side rectangle (including square) circle triangle, face, edge, vertex, vertices cube pyramid sphere
Fractions	Parts of a whole, half, quarter
Problem solving	pattern puzzle what could we try next? how did you work it out? recognise describe draw compare sort, count, sort group, set list

Year 1	
Number and place value	Ten more/less, digit, numeral, figure(s), compare, (in) order/a different order, size, value, between, halfway between, above, below, tens, ones
Addition and subtraction	Number bonds, number line, add, more, plus, make, sum, total, altogether, inverse, double, near double, equals, is the same as (including equals sign), difference between, subtract, take away, minus, How many more to make …?, How many more is … than … ?, How much more is … ?, How many fewer is … than … ?, How much less is … ? part, whole, numbers one-twenty, represents, compose, combine, partition, Number blocks, Part-Part-Whole model, Tens Frame, fingers, five-and-a-bit, systematic, subitise, one more, one less, total, plus, minus, equal to, addition, subtraction, quantity, increase, decrease first, then, now, expression, equation, addend + addend = sum, minuend-subtrahend = difference,
Multiplication and division	Once, twice, three, five times, multiple of times, multiply, multiply by, repeated addition, array, row, column, double, halve, share, share equally, group in pairs, threes, etc., equal groups of, divide, divided by, left over, twos, fives, tens, half, doubling
Measure	Time, days of the week, seasons, day, week, month, year, weekend, birthday, holiday, morning, afternoon, evening, night, midnight, bedtime, dinnertime, playtime, today, yesterday, tomorrow, before, after, next, last, now, soon, early, late, quick, quicker, quickest, quickly , fast, faster, fastest, slow, slower, slowest, slowly, old, older, oldest, new, newer, newest, takes longer, takes less time, hour, o'clock, half past, clock, watch, hands, how long ago?, How long will it be to … ?, How long will it take to … ?, How often?, always, never, often, sometimes, usually, once, twice, first, second, third, etc., estimate, close to, about the same as, just over, just under, too many, too few, not enough, enough, length, width, height, depth, long, longer, longest, short, shorter shortest, tall, taller, tallest, high, higher, highest, Low, wide, narrow, deep, shallow, thick, thin, far, near, close, metre, ruler, metre stick, How much?, How many?, money, coin, penny, pence, pound, price, cost, buy, sell, spend, spent, pay, change, dear(er), costs more, costs less, cheaper, costs the same as, total
Geometry (position and direction)	Before, after, beside, next to, opposite, apart, between, middle, edge, centre, corner, direction, journey, left, right, up, down, forwards, backwards, sideways, across, close, far, near, along, through, to, from, towards, away from, movement, slide, roll, turn, whole turn, half turn, stretch, bend
Geometry (properties of shape)	Corner (point, pointed), face, side, edge, make, build, draw
Fractions	Whole, equal parts, four equal parts, one half, two halves, a quarter, two quarters

Problem solving	Change, change over, split, separate, carry on, continue, repeat, what comes next?, find, choose, collect, use, make, build Tell me, describe, pick out, talk about, explain, show me, read, write, record, trace, copy, complete, finish, end, fill in, shade, colour, tick, cross, draw, draw a line between, join (up), ring, arrow, cost, count, work out, answer, check same number(s)/different number(s)/missing number(s), number facts, number line, number track, number square, number cards, abacus, counters, cubes, blocks, rods, die, dice, dominoes, pegs, peg board, same way, different way, best way, another way, in order, in a different order, not all, every, each

Year 2	
Number and place value	Numbers to one hundred, hundreds, partition, recombine, more/less
Addition and Subtraction	Part, whole, numbers one-hundred, represents, compose, combine, partition, total, part-part-whole model, tens frame, fingers, five-and-a-bit, systematic, plus, minus, equal to, addition, subtraction, quantity, increase, decrease, first, then, now, expression, equation, addend + addend = sum, minuend- subtrahend = difference, bar model, difference, Deines, exchange, count on, count back, number line, tens boundary,
Multiplication and Division	twos, fives, tens, threes, group, equal, unequal, repeated addition, multiplication, expression, equation, part, altogether, represents, amount, size, division, factor, divided by, skip counting, multiplication facts, amount, size,
Measure	Quarter past/to, metres, kilometers, grams, kilograms, millimeters, liters, temperature, degrees
Geometry (position and direction)	Rotation, clockwise, anticlockwise, straight line, ninety degree turn, right angle
Geometry (properties of shape)	Size, bigger, larger, smaller, symmetrical, line of symmetry, fold, match, mirror line, reflection, pattern, repeating pattern
Fractions	Three quarters, one third, a third, equivalence, equivalent
Data/statistics	Count, tally, sort, vote, graph, block graph, pictogram, represent, group, set, list, table, label, title, most popular, most common, least popular, least common
Problem solving	Predict, describe the pattern, describe the rule, find, find all, find different, investigate

Year 3	
Number and place value	Numbers to one thousand
Addition and subtraction	Column addition and subtraction, part, whole, Ones, Tens, Hundreds, represents, compose, combine, partition, total, part-part-whole model, Deines, 100 square, plus, minus, equal to, addition, subtraction, expression, equation, exchange, complements, addend + addend = sum, minuend – subtrahend = difference, regroup, algorithm,
Multiplication and division	Product, multiples of four, eight, fifty and one hundred, scale up, division commutative, grouping (quotative), sharing (partitive), divided into, divided between, divided by, equation, factor, product, multiply, divide, unitise, Ten/Hundred times, bigger, smaller, one-tenth the size, one-hundredth the size, Gattegno chart, factor, product, multiple, groups of, inverse
Measure	Leap year, twelve-hour/twenty-four-hour clock, Roman numerals I to XIII
Geometry (position and direction)	Greater/less than ninety degrees, orientation (same orientation, different orientation)
Geometry (properties of shape)	Horizontal, perpendicular and parallel lines
Fractions	Numerator, denominator, unit fraction, non-unit fraction, compare and order, tenths
Data/statistics	Chart, bar chart, frequency table, Carroll diagram, Venn diagram, axis, axe
Year 4	
Number and place value	Tenths, hundredths, decimal (places), round (to nearest), thousand more/less than, negative integers, count through zero, Roman numerals I to C
Addition and Subtraction	Part, whole, Ones, Tens, Hundreds, Thousands, represents, compose, combine, partition, total, part-part-whole model, Deines, 100 square, plus, minus, equal to, addition, subtraction, expression, equation, exchange, complements, addend + addend = sum, minuend – subtrahend = difference, regroup, algorithm,
Multiplication and division	Multiplication facts (up to 12x12), division facts, inverse, derive, Multiply, divide, commutative, groups of, times, equal to, factors, product, quotient, dividend, divisor, represents, array, multiplication, distributive lay, adjacent, multiples, factors, partitioning, equations, expressions, arrays, part-whole model, difference

Measure	Convert
Geometry (position and direction)	Co-ordinate, translate, quadrant, X-axis, Y-axis, perimeter, area
Geometry (properties of shape)	Quadrilaterals, triangles, right, acute and obtuse angles
Fractions and decimals	Equivalent decimals and fractions
Data/statistics	Continuous data, line graph

Mathematics Non-Negotiables

Planning:	Resources:	Presentation:	Assessment:	Inclusion for All:
• School format for planning will be used and will identify: Learning Objective, Skills Progression, Teacher input, Practise It and Review It sections • Planning will be shared on p/drive with Key Stage Team • Resources will be identified on the planning • Links to other curriculum areas will be made where appropriate	• Maths overview • Knowledge organisers • End of unit assessments • Concrete, pictorial and abstract resources • NCTEM Planning documents • White Rose Resources and subscription • Knights Templar Times Tables Progression documentation/booklets	• Refer to Maths presentation policy • Dates underlined • LO- as a question linked to knowledge • Draw diagrams/ pictures on plain paper • Stick worksheets in straight with glue • Floor books can be used to record class learning	• Prior learning revisit • Now I know… • Oral quizzes to recap learning • Lesson plenary- what have we learnt today? What do we now know? • End of unit retrieval assessments	• Pre-teaching of key vocabulary • Teacher modelling and scaffolding of strategies • Use of practical resources • Use of alternative methods of recording • Use of scribes/partnered work