

# **Cheadle Catholic Junior School**

## **Mathematics Policy**

### **Teaching for Mastery**

#### **Principles of Mastery**

- Teaching is underpinned by a belief in the importance of mathematics and that the vast majority of children can succeed in learning mathematics in line with national expectations.
- The whole class is taught mathematics together, with no differentiation by acceleration to a new content.
- The learning needs of individual pupils are addressed through careful scaffolding, skilful questioning and appropriate rapid intervention, in order to provide the necessary support and challenge.
- Factual knowledge (e.g. number bonds and times tables), procedural knowledge (e.g. formal written methods) and conceptual knowledge (e.g. of place value) are taught in a fully integrated way and are all seen as important elements in the learning of mathematics.
- The reasoning behind mathematical processes is emphasised. Teacher/pupil interaction explores in detail how answers were obtained, why the method/strategy worked and what might be the most efficient method/strategy.
- Teachers aim to use precise mathematical language, in full sentences so that mathematical ideas are conveyed with clarity and precision. Pupils are required to do the same.
- Conceptual variation and procedural variation are used throughout teaching, to present the mathematics in ways that promote deep, sustainable learning.
- Sufficient time is spent on key concepts (e.g. multiplication and division) to ensure learning is well developed and deeply embedded before moving on.

#### **Aims at Cheadle Catholic School**

- To promote a positive attitude to Mathematics.
- To ensure that each child develops their full potential.
- To develop knowledge and understanding of number, geometry, fractions, statistics and measurement.
- To develop a wide range of mental strategies.
- To develop an ability to think clearly and logically with confidence and flexibility.
- To help the children develop their independence with mathematical tasks.
- To help the children develop their creative and critical thinking skills to solve problems.

- To develop enthusiasm and persistence for sustained investigative work over a period of time.
- To develop an awareness of the uses of Mathematics in the world beyond the classroom and to support their future economic well-being.
- To be collaborative learners, who are able to offer constructive feedback and criticism to their peers.
- To understand that the answer is only the beginning.

## **Approach**

Due to a whole class, step-by-step teaching approach, children are able to move through the curriculum at broadly the same pace. As a result of spending more time on fundamentals, the children can establish firm foundations on which to build their understanding. Because of our concrete-pictorial-abstract approach, children learn to see the connections in maths and understand that mathematics can be represented in different ways. The maths curriculum, provides sufficient opportunities for planned revisits of previously learned knowledge, concepts and procedures. This is to ensure that, once learned, mathematical knowledge becomes deeply embedded in pupils' memories - freeing pupils' attention to work with independence and apply their mathematical knowledge to more complex mathematics.

Those pupils behind age-related expectations are supported with pre-teaching, assembly time support, targeted questioning and targeted support in lessons from adults. Children who grasp concepts rapidly are challenged with greater depth problems from the within lessons. We use a White Rose as a basis of our lessons. This is as a starting point in order to develop a coherent and comprehensive pathway through mathematics. We supplement this with a number of resources including NCETM resources and NRICH. Children at CCJS work on their arithmetic proficiency through weekly lessons and assessments.

Lessons typically begin with a flash back activity, arithmetic practise, small steps, reasoning which will involve open discussion and collaborative work before consolidation of their understanding in individual exercises. We move through different activities ensuring that fluency is secured as well as reasoning throughout.

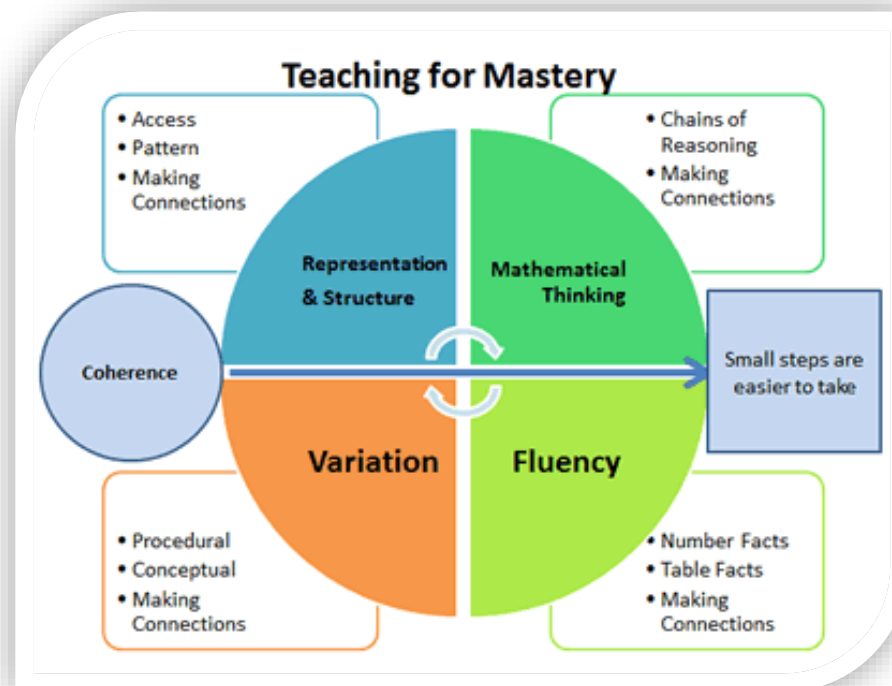
Teachers plan lessons using their own professional judgement, daily formative assessment and feedback from pupils. Teachers use their professional judgement to determine how long to spend on a particular objective. Feedback is provided to pupils verbally, through teacher marking, peer marking and self-marking. This informs teaching for the next lesson.

Maths is included in other subject areas where appropriate exposing children to mathematical thinking and concepts across the curriculum. Home learning and deliberate practise of key number facts is encouraged across school through participation in Time Tables Rockstars.

The lesson journey is evident on flipcharts or PowerPoint as there is no requirement for teachers to produce detailed paper plans.

## Features of Lessons

- Whole class sessions (everyone moving together whilst supporting and providing deeper learning where appropriate)
- Lessons are designed with procedural variation to include small, carefully planned steps building up throughout the lesson.
- Reasoning opportunities are provided within each lesson.
- Fluency activities are provided through intelligent practice.
- Conceptual variation shows standard and non-standard versions, plus what it is and what it isn't as well as a range of representations.
- Learning is supported through direct teaching of vocabulary and stem sentences to support the children.
- Children are not labelled with high/low ability or grouped.
- The answer is only the beginning in lessons.
- Differentiation is provided through the depth of activities and responded to in green pen.
- Pre-teach and post-teach happens where appropriate to ensure children are not left behind.
- Lessons are focused towards the teaching of a key skill.
- There is interchange between concrete/contextual ideas, pictorial representations and their abstract/symbolic representation.
- Mathematical generalisations are emphasised as they emerge from underlying mathematics, which is explored within contexts that make sense to pupils.
- Making comparisons is an important feature of developing deep knowledge.
- Formative assessment is carried out throughout the lesson; the teacher regularly checks pupils' knowledge and understanding and adjusts the lesson accordingly.
- Gaps in pupils' knowledge and understanding are identified early by in-class questioning. They are addressed through individual or small group intervention. The interventions may take place in class or at a later time, which may be separate from the main mathematics lesson, to ensure pupils are ready for the next lesson.



## **Assessment**

Clear expectations, targets and assessment of maths are in line with our Assessment Policy and Marking and Feedback Policy.

Each unit of work begins by ascertaining the children's prior knowledge and any connected knowledge held in their long-term memory. Any misconceptions that arise throughout the unit are identified and addressed appropriately. Children continue to recall their knowledge throughout a unit in order to ensure an alteration in long term memory. The curriculum provides sufficient opportunities for planned revisits of previously learned knowledge, concepts and procedures; this is to ensure that, once learned, knowledge becomes deeply embedded in pupils' memories. To further support ongoing formative assessment, teachers review pupils' contributions in lessons, work in their books and attainment in end of unit assessments (provided by White Rose). Within lessons, books are marked alongside children where possible to provide in the moment support, next steps and feedback.

These are supported by end of term formative assessments and end of year tests (White Rose Assessment Year 3, 4 and 5 and SATs Year 6).

Progress and attainment are recorded on tracking sheets on SIMs and reported termly to SLT through pupil progress meetings. Maths subject leader monitors the quality of teaching and learning through: observations, learning walks, professional dialogue, book looks and pupil voice.

## **Equal Opportunities**

Cheadle Catholic Junior School is committed to ensuring the active participation and progress of all children in their learning.

All children will be given equal opportunities to achieve their best possible standard, whatever their current attainment and irrespective of gender, ethnic, social or cultural background, home language or any other aspect that could affect their participation of the progress of which they are capable.

## **Inclusion**

Taking a mastery approach, differentiation occurs in the support and intervention provided to the children. The national curriculum states:

“Children who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.”

There is little differentiation in the content taught but the questioning and scaffolding individual children receive in class as they work through problems will differ, with rapid graspers challenged through more demanding problems, which will deepen their knowledge of the same content.

Children working below year group expectations, with support of the SENCO and SEND Paperwork (EHCP) will have a personalised approach to maths education.

### **Home/ School Link**

- CCJS recognises that parents and carers have a valuable role to play in supporting their child's mathematical learning. An overview of the Maths curriculum is available on the school's website, as well as guidance in the progression in calculation methods used by the school. Year 3 and Year 4 parents are sent information to support their children in learning Multiplication Facts.
- Parents are informed of their child's progress of Parents Evening and this is also communicated in written school reports.
- Curriculum plans are shared with parents during the initial curriculum overview meetings.

### **Role of the Subject Leader**

- The subject leader will raise the profile of maths at Cheadle Catholic Junior school. They will model lessons as appropriate and support others with continued professional development.
- They will monitor progression and continuity of maths throughout the school through learning walks and regular monitoring of outcomes of work in maths exercise books.
- The subject leader will ensure that all staff have access to year group plans and the relevant resources which accompany them.
- The subject leader will monitor children's progress and analyse the whole school data. This will feed into the action plan and school development plan.
- They will monitor the children's books, working walls and lessons where appropriate and feedback to SLT.
- The subject leader will organise, audit and purchase central and class-based maths resources.
- They will provide CPD where relevant and take part in engagement with educational research.
- The subject leader will feedback to SLT and governors regularly.
- The subject leader will keep up-to-date with current developments and share this with staff. They will work with the Maths Hub as a mastery specialist and support staff in demonstrating best practice to visitors from other schools as part of the school's work with the NCETM.
- The subject leader will extend relationships and make contacts beyond the school..

### **Induction for new staff**

We work closely with the NCETM to ensure that new staff are provided training (subject knowledge, TAs and Teachers and ECT teacher training) throughout the year. These sessions are run through the NCETM NW1 hub.

Staff are encouraged to observe other maths lessons and take part in a joint planning session before teaching maths to ensure the mastery approach is being used.

# Maths Overview of Skills and Progression

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Topics covered	<p><b>Autumn</b> Place Value Addition and Subtraction Shape Place Value consolidation</p> <p><b>Spring</b> Addition and subtraction Place value Length and height Weight and volume</p> <p><b>Summer</b> Multiplication and division Fractions Position and direction Place value Money Time</p>	<p><b>Autumn</b> Place Value Addition and subtraction Shape</p> <p><b>Spring</b> Money Multiplication and division Length and height Mass, capacity and temperature</p> <p><b>Summer</b> Fractions Time Statistics Position and Direction</p>	<p><b>Autumn</b> Place Value Addition and subtraction Multiplication and division</p> <p><b>Spring</b> Multiplication and division Length and perimeter Fractions Mass and capacity</p> <p><b>Summer</b> Fractions Money Time Shape Statistics</p>	<p><b>Autumn</b> Place Value Addition and subtraction Area Multiplication and division</p> <p><b>Spring</b> Multiplication and division Length and perimeter Fractions Decimals</p> <p><b>Summer</b> Decimals Money Time Shape Statistics Position and direction</p>	<p><b>Autumn</b> Place Value Addition and Subtraction Multiplication and division Fractions</p> <p><b>Spring</b> Multiplication and division Fractions Decimals and percentages Area and perimeter Statistics</p> <p><b>Summer</b> Decimals Shape Position and direction Decimals Negative numbers Converting units Volume</p>	<p><b>Autumn</b> Place Value Four Operations Fractions Converting units</p> <p><b>Spring</b> Ratio Algebra Decimals Fractions, decimals and percentages Perimeter, area and volume Statistics</p> <p><b>Summer</b> Shape Position and direction Problem solving Consolidation</p>
Number and place Value	<p>Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.</p> <p>Count, read and write numbers to 100 in numerals and words.</p> <p>Given a number, identify one more or one less.</p> <p>Identify and represent numbers using objects and pictorial representations.</p> <p>Use the language of: equal to, more than, less than, most and least.</p> <p>Count in steps of 2, 5 and 10 from 0.</p>	<p>Read and write numbers to 100 in numerals and words.</p> <p>Recognise the place value of each digit in a two-digit number</p> <p>Identify, represent and estimate numbers using different representations.</p> <p>Compare and order numbers to 100 using <math>&lt;</math> <math>&gt;</math> and <math>=</math></p> <p>Use place value and number facts to solve problems.</p> <p>Count in steps of 2, 3 and 5 from 0 and in 10s from any number backwards and forwards.</p>	<p>Identify, represent and estimate numbers using different representations.</p> <p>Find 10 or 100 more or less than a given number.</p> <p>Recognise the place value of each digit in a three-digit number.</p> <p>Compare and order numbers up to 1000.</p> <p>Read and write numbers up to 1000 in numerals and in words.</p> <p>Solve number problems and practical problems involving these ideas.</p>	<p>Count in multiples of 6, 7, 9, 25 and 1000.</p> <p>Find 1000 more or less than a given number.</p> <p>Recognise the place value of each digit in a four-digit number.</p> <p>Order and compare numbers beyond 1000.</p> <p>Identify, represent and estimate numbers using different representations.</p> <p>Round any number to the nearest 10, 100 and 1000.</p> <p>Solve number and practical problems. Count back through</p>	<p>Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit.</p> <p>Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000.</p> <p>Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through 0.</p> <p>Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10000 and 100000.</p>	<p>Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.</p> <p>Round any whole number to a required degree of accuracy.</p> <p>Use negative numbers in context and calculate intervals across 0.</p> <p>Solve number and practical problems.</p>

			Count from 0 in multiples of 4, 8, 50 and 100.	zero to include negative numbers.  Read Roman numerals to 100.	Solve number problems and practical problems that involve these.  Read Roman numbers to 1000 and recognise years.	
Tier 3 Vocabulary	<p>Sort Group Count Match Total Amount Altogether Digit Less/More Sequence Consecutive Missing numbers Backwards/Forwards Column/ Row Single digit Two digit Tens and ones Finding the difference Least/most Order Representations Largest/ smallest Biggest/ greatest Least</p> <p>One more/ One less Equal to Greater than/ Less than Fewer &lt;, &gt; or = Compare Efficient method Difference Greatest/ Smallest Order Ordinal numbers Positional numbers First, second, third... last Numerals and words Missing numbers More than/less Exchange Equivalent Compare Ascending/ descending</p>	<p>Consecutive/ Non-consecutive Count One more/ one less Largest/ smallest Similar/ Difference Represent Match Altogether Express Group Tens/ ones Digits Partition/Recombine Calculation</p> <p>Diagram Rearrange Place value Equal value Compare Greater than/ less than More than Fewer Most/ Least Equal to Multiple Pattern Forwards/ backwards</p>	<p>Different representations Place value Hundreds, tens and ones Even/odd Different ways Numerals/ digits/ words All possibilities Solutions/ Method Calculations Estimate Value Closest/ furthest Halfway More than/less than Subtract/ add</p> <p>Same/ different/ similarity/ difference Symbol Greatest/ smallest Compare Column/ Row Most/least Ascending/ descending order Pattern Increase/ decrease Sequence Ordering Relationship Multiples/Product/ Factors Venn diagram</p>	<p>Roman numerals Represent Numerals/ words/ digits Diagrams Function machines Total Multiples/ Factors/ Product More/less than Rounding Columns Possibilities Sum Compare/ Relationship Similar/ different Thousands/Hundreds/tens/ ones Altogether Even/ odd Value/ missing values</p> <p>Multiply Double/ Half Digit total Partitioning/ Exchanging Estimating/ approximately Add/ subtract Patterns Greater than/ less than/ more/ fewer/ smaller Symbols Digit total Ascending/ descending Highest/ lowest Order/ Rearrange Increase/ decrease Errors Positive/ negative numbers Degrees Warmer/colder temperature</p>	<p>Addition/ subtraction Make and explain Match Digit total Greatest/ smallest Ordering Roman Numerals Patterns Function machines Numerals/ words/ digits Total Values Rounding Place value columns Same or difference Possibilities Estimate Divisions Forwards/ backwards</p> <p>Number sequences Less than/ more than Partitioning Compare/ order Statements/ story Symbols Sum/ difference Multiples Powers of 10 Sequences Terms Double/ half / half way Highest/ lowest value Odd/ even Negative numbers Position Backwards/ forwards Increase/ decrease</p>	<p>Concrete/ pictorial/ abstract Diagrams/ tables Represent Divisions on a number line Partitioning Strategies Part-whole Missing numbers Less than/ greater than Statements Digits/ numerals/ words Double/ half More/less/ fewer Compare/order Inequality and equality symbols</p> <p>Value Story/ statement Greatest/ smallest Digit totals Accurate/ inaccurate Rounding Columns Justify/ reasoning Greatest possible difference Smallest possible difference Intervals Positive/ negative Difference between</p>
Addition and subtraction	<p>Represent and use number bonds and related subtraction facts within 20.</p> <p>Read, write and interpret mathematical statements involving addition, subtraction and equals signs.</p> <p>Add and subtract one-digit numbers to 10, including 0.</p> <p>Add and subtract one-digit and two-digit numbers to 20.</p> <p>Solve one step problems that involve addition and subtraction and missing number problems.</p>	<p>Recall and use addition and subtraction facts to 20 fluently and derive related facts to 100.</p> <p>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 and three one-digit numbers.</p> <p>Show that addition is commutative, but subtraction is not.</p> <p>Solve problems with addition and subtraction applying</p>	<p>Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds.</p> <p>Add and subtract numbers with up to three digits, using formal written methods.</p> <p>Estimate the answer to a calculation and use inverse operations to check the answers.</p> <p>Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</p>	<p>Add and subtract numbers with up to 4 digits using the formal written methods.</p> <p>Estimate and use inverse operations to check answers to a calculation.</p> <p>Solve addition and subtraction two step problems in context, deciding which operations to use and why.</p>	<p>Add and subtract numbers mentally with increasing large numbers.</p> <p>Add and subtract whole numbers with more than 4 digits, formally.</p> <p>Use rounding to check answers and determine in the context of a problem, level of accuracy.</p> <p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p>	<p>Solve addition and subtraction multi-step problems deciding on which operations and methods to use and why.</p> <p>Perform mental calculations, including with mixed operations and large numbers.</p> <p>Use estimation to check answers and accuracy.</p>

		increasing knowledge of mental and written methods.										
		Recognise and use the inverse relationship and use this to check calculations and solve missing number problems.										
Tier 3 Vocabulary	<p>Number bonds Partitioning Whole/ parts Numerals/ words Sorting/ grouping Addition/ subtraction/Plus Equal to/ Total Altogether Images/ pictures Commutative Fact families Bigger/ smaller Systematically Patterns Similar/ different How many more? How many less? Order/ Digit Efficient Starting number Calculation One and two-digit Partition Fact families</p>	<p>Greater /less than Larger/ bigger Mental strategy Highest/ lowest Missing parts Word problems Spending/ buying/ how much Taking away How many left? How many at first? Matching Rules Quantities Counting on/ counting back Finding difference Would you rather have? Symbols/ signs Number bonds Represented Double Mental method Strategy</p>	<p>Addition/ subtraction Taking away Parts/ whole Commutative properties Inverse operation Related facts Relationships Signs and symbols Associated facts Number sentences Combinations Equivalent Checking Greater than/ less than/ equals Total/ calculations/ patterns Tens and ones Same and different Difference between</p>	<p>Horizontal/ vertical Multiples More/ less Reduced/ increased Backwards/ forwards Give away and have left Counting on Finding the difference Partition Recombine Exchange Bridge Column method Efficiently Sum/ altogether/ total/ solve Number pairs Greatest/ smallest Double/ half Odd/ even Consecutive</p>	<p>Greater Smaller Ones/ tens/ hundreds Represent Equal Multiples Calculation Adding/ subtracting Column Whole number &lt; &gt; = Place value Most/ least Strategy Pattern Increase/ decrease Exchanging Single digit, two digit or three digit Regrouping Efficient Mental methods</p>	<p>Inverse Commutativity Odd/ even Function machine Written method Position Model Representation Greatest/ smallest Fact family Total Missing value Counting on/ counting back Near subtraction Number bonds Estimation Position</p>	<p>Adding/ subtracting Thousands, hundreds, tens, ones Place value column Exchange Crossing boundaries Calculation Together Possibilities Odd/ even Altogether Solution Similarities/ differences Digit total</p>	<p>Greatest/ smallest Pattern Increase/ decrease Inverse Fact families Operation Efficient Representation Rounding Estimating Strategies</p>	<p>Columns Exchange Digits Commutative Place value Inverse Fact family Represent Column method Possibilities Missing numbers Thousands, hundreds, tens, ones</p>	<p>Descends How much more? Find the difference Estimating Rounding Approximate Accurate/ inaccurate Corresponding operations</p>	<p>Place value column Exchange Missing digits Inverse Commutative Mental methods Find the difference Digit total Fact family</p>	<p>Rounding Efficiently Venn diagram Sequence Relationships Estimate/ approximate</p>
Multiplication and division	<p>Count in multiples of twos, fives and tens.</p> <p>Solve one step problems involving multiplication and division by calculating the answer using arrays, pictures and concrete objects.</p>	<p>Recall and use multiplication and division facts for the 2, 5- and 10-times tables.</p> <p>Recognise odd and even numbers.</p> <p>Write mathematical statements using the correct signs.</p> <p>Solve problems using materials, arrays, repeated addition, mental methods and facts including problems in context.</p> <p>Show that the multiplication of two numbers is commutative but division is not.</p>	<p>Count from 0 in multiples of 4, 8, 50 and 100.</p> <p>Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.</p> <p>Write and calculate mathematical statements for multiplication and division using the multiplication tables they know, using mental and progressing to formal written methods.</p> <p>Solve problems, including missing number problems and positive integer scaling problems and correspondence problems.</p>	<p>Count in multiples of 6, 7, 9, 25 and 1000.</p> <p>Use place value, known and derived facts to multiply and divide mentally, including multiplying and dividing by 0 and 1 and multiplying three numbers together.</p> <p>Solve problems involving multiplying, integer scaling problems and harder correspondence problems.</p>	<p>Recall and use multiplication and division facts up to 12 x 12.</p> <p>Count in multiples of 6, 7, 9, 25 and 1000.</p> <p>Use place value, known and derived facts to multiply and divide mentally, including multiplying and dividing by 0 and 1 and multiplying three numbers together.</p> <p>Solve problems involving multiplying, integer scaling problems and harder correspondence problems.</p>	<p>Multiply and divide numbers mentally drawing upon known facts.</p> <p>Multiply and divide whole numbers by 10, 100 and 1000.</p> <p>Identify multiples and factors, including finding all factors pairs of a number, and common factors.</p> <p>Recognise and use square numbers and cube numbers.</p> <p>Solve problems involving multiplication and division including factors, multiples, squares and cubes.</p> <p>Know and use the vocabulary of prime numbers, prime factors and composite numbers.</p>	<p>Perform mental calculations, including with mixed operations and large numbers.</p> <p>Multiply multi-digit numbers up to 4 digits by a 2-digit number.</p> <p>Divide numbers up to 4 digits by a 2-digit number using long division and interpret remainders as fractions, decimals or rounding.</p> <p>Divided numbers up to 4 digits using short dividing.</p>					



				Recognise and use factor pairs and commutativity in mental calculations.  Multiply two- and three-digit numbers by a 1-digit number using formal methods.	Establish whether a number up to 100 is prime and recall prime numbers up to 19. Multiply 4-digit numbers by 1- or 2-digit numbers using column methods. Divide numbers up to 4 digits by a 1-digit number using formal methods and interpret the remainders. Solve problems involving all 4 operations.	Identify common factors, common multiples and prime numbers.  Use their knowledge of the order of operations.  Solve problems using all four operations.  Use estimation to check answers and accuracy.
Tier 3 Vocabulary	<p>Tens Counting up and back Altogether Groups of Equal/ unequal Multiplication How many Represent Patterns Arrays</p> <p>Columns Rows Doubling/ halving Division Sharing Equally Left over between</p>	<p>Equal Unequal Repeated addition Multiplication Represent Groups Tens and ones Arrays Total Lots of Multiplied Times Number sequences Altogether Commutativity Statements More than/ less than Solve Multiple and factor Even and odd Calculate</p> <p>Multiplication fact Divide Division Sharing Equally "groups of" Altogether How many groups? Number sentence Greater and less than Halving Doubling odd and even Efficient strategies Same as Left over/ remainder Pattern Calculation Word problem</p>	<p>Equal groups Represent Altogether Represent Lots of Groups of Repeated addition Multiplication Commutative Sharing Grouping Difference Division Fact families Inverse Relationships Pattern Doubling /Halving Times More/ less Function machines</p> <p>Split Multiples Factors Arrays Repeated addition &lt; &gt; = Bigger/ smaller Greater/ less Represent Fact family Calculation One/ two or three digit Estimation Partitioning Dividend Quotient Divisor Remainder Systematic Scaling</p>	<p>Lots of Commutative law Represented Calculation Place value &lt; &gt; = Multiplied Whole number Possibilities Greater/ smaller Exchanging Value Digits Sharing Grouping Fact family Altogether Patterns Relationships Odd/even Multiple Factor Sum Product Divided</p> <p>Quotient Divisor Statements Calculations Inverse Mental/ written Product Sum Systematic Arrays Factor pairs Special number Partition Associative law Halving/ doubling Exchange Estimation Formal method Value Columns Remainders Divisible Solutions Possibility</p>	<p>Multiples Similarities/ differences Patterns Factors Products Odd/ Even Commutative Column Value Digits Calculation Array Relationships Division/ multiplication Factor pairs Systematic Sum Abundant number Common factors Venn diagrams Prime numbers Prime factors Composite numbers Squared Cubed Inverse Double/ halve</p> <p>Missing numbers Fact family Reminder Digits moving Direction Place holder Columns and place value Digits Calculation Product Exchange Consecutive Size Scale Area Representations Totals Methods Largest and smallest Estimate Groups Measure Division Sharing Remainders Dividend Quotient</p>	<p>Place value column Exchange Missing digits Inverse Commutative Mental methods Find the difference Digit total Multiples/ factors Fact family Dividend Quotient Scale Remainder Rounding</p> <p>Factor pairs Efficiently Lowest common multiples Product Venn diagram Squared/ cubed Prime/ prime factors/ composite Odd/even Sequence Relationships Root Order of operations/ BODMAS Estimate/ approximate</p>
Fractions (including decimals and percentage)	<p>Recognise, find and name a half as one of two equal parts.</p> <p>Recognise, find and name a quarter as one of four equal parts.</p> <p>Compare, describe and solve practical problems for light and height, mass and weight and capacity and volume (e.g. double and half)</p>	<p>Recognise, find, name and write fractions <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{2}{4}</math> and <math>\frac{3}{4}</math>.</p> <p>Write simple fractions for example <math>\frac{1}{2}</math> of 6 = 3 and recognise the equivalence of <math>\frac{2}{4}</math> and <math>\frac{1}{2}</math></p>	<p>Count up and down in tenths, recognise that tenths arise from dividing an object into 10 equal parts or a quantity.</p> <p>Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.</p> <p>Recognise and show, using diagrams, equivalent fractions with small denominators.</p>	<p>Recognise and show, using diagrams, families of common equivalent fractions.</p> <p>Count up and down in hundredths; recognise that hundredths arise when dividing by 100.</p> <p>Solve problems involving increasingly harder fractions to calculate quantities, divide quantities and use non-unit fractions.</p>	<p>Compare and order fractions whose denominators are multiples of the same number. Identify, name and write equivalent fractions of a given fraction.</p> <p>Recognise mixed and improper fractions and convert from one form to another.</p> <p>Add and subtract fractions with the same denominator and denominators that are multiples of the same number.</p>	<p>Use common factors and multiples to simplify fractions.</p> <p>Compare and order fractions including those greater than 1.</p> <p>Generate and describe linear number sequences.</p> <p>Add and subtract fractions with different denominators and mixed numbers.</p>

			<p>Compare and order unit fractions with the same denominators.</p> <p>Add and subtract fractions with the same denominator within one whole.</p> <p>Solve problems.</p>	<p>Add and subtract fractions with the same denominator.</p> <p>Recognise and write decimal equivalents to any number of tenths or hundredths.</p> <p>Find the effect of dividing a number by 10 or 100.</p> <p>Solve simple measure and money problems using this.</p> <p>Convert between different units of measurement.</p> <p>Compare numbers with the same number of decimal places up to 2dp.</p> <p>Round decimals with 1dp. to the nearest whole number.</p> <p>Recognise and write decimal equivalents to <math>\frac{1}{4}</math>, <math>\frac{1}{2}</math> and <math>\frac{3}{4}</math>.</p>	<p>Multiply proper fractions and mixed numbers by whole numbers with support. Recall and write decimal numbers as fractions. Solve problems including scaling. Read, write, order and compare numbers with up to three dp. Recognise and use thousandths. Round decimals with 2dp. to the nearest whole number and 1dp. Solve problems up to 3dp. Recognise the % symbol and understand it. Write percentages as fractions over 100 and decimals. Solve problems using fraction, decimal and percentage equivalents of <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math>, <math>\frac{2}{5}</math> and <math>\frac{4}{5}</math>. Multiply and divide whole numbers and decimals by 10, 100 and 1000. Use all 4 operations to solve decimal measurement problems.</p>	<p>Multiple fractions by whole numbers and pairs of fractions.</p> <p>Divide fractions by whole numbers.</p> <p>Associate fractions with decimal equivalences and percentages.</p> <p>Identify the value of each digit in numbers to 3dp. and multiply and divide by 10, 100 and 1000.</p> <p>Multiply one-digit numbers up to 2dp. by whole numbers.</p> <p>Use division for decimals.</p> <p>Solve problems including this.</p> <p>Solve problems involving the calculation of percentages and increase and decrease.</p> <p>Recall and use equivalences between simple fractions, decimals and percentages.</p>
Tier 3 Vocabulary	<p>Half Whole One of two parts Parts Split Shared Equal Cut Match Amount</p> <p>Equally in two Groups Odd Even Quarters Four parts More/ less or equal Same/ different Capacity</p>	<p>Whole Equal parts Unequal parts Split Shared Same/ different Identical/ unidentical Groups Half/ halves Fraction Represent Dividing by 2 Shading Quarter / third</p> <p>More/ less Longest/ shortest Unit fractions Non-unit fractions Equivalent Difference Represent Numerator Denominator Patterns Counting up and down Parts in a whole</p>	<p>Unit fractions Non-unit fractions Difference/ same Fractions of numbers and fractions of shapes Representations Equal parts Shaded Circled Numerator Denominator Equal to a whole Less than a whole Equivalent fraction Making the whole Tenths Decimals Decimal point</p> <p>Ones Forwards Backwards Split Equal groups Dividing Exchanging Quantities Proportion Double/ halve Compare Ascending/ descending Smallest fraction/ largest fraction Altogether Find the difference</p>	<p>Fractions of shapes/ quantities and on a number line Non-unit Unit fractions Numerator Denominator Represent Groups Sorting Fractions of amounts Split/ share Partition Representations Equal parts Equivalent fractions Proportion Patterns Relationships Multiply/ divide Parts</p> <p>One Forward Backward Split Equal groups Dividing Exchanging Quantities Proportion Double/ halve Compare Ascending/ descending Smallest fraction/ largest fraction Altogether Find the difference</p> <p>Fraction Decimal Rows Columns Split Representation What is the difference? Decimal point Centimetres Metres Jumps Scale Increments Place holder Division Multiplication Columns Value Move ___ places to the ___ Exchange Smaller Larger Longer/ shorter</p>	<p>Equivalent Representations/ models Numerator/ Denominator Simplify Odd/even Convert Mixed number/ improper fraction Grouping/ remainder Sequences Compare/ Order Greatest/ smallest Ascending/ descending Multiple/ factor Common denominator Find the difference</p> <p>Convert Fractions Simplified Whole Expanded form Words Rounding Nearest whole/ one decimal place Same and different Smallest and largest possible difference Ascending/ descending Per cent Parts of a hundred Represent Denominator Numerator Proportions Equivalent</p>	<p>Common factors Simplify Efficient Numerator/ denominator Division Simplest terms Equivalent fractions Improper fractions / mixed numbers Common denominator Number lines Order &lt; &gt; Common numerator Greatest/ smallest Parts/ sub-parts Divisible Increased/ decreased Decimal place</p> <p>Factor Sharing Grouping Remainder Convert Simplify Equivalent Numerator Denominator Efficient Percent Out of 100 Equivalent fractions Convert Represent Multiply/ divide Decimal Simplest form Effective/ effective Percentage of a number Half/quarter Shared</p>

				<i>Altogether</i> <i>Improper</i> <i>Mixed</i> <i>Greater than a whole</i> <i>Add/ subtract</i> <i>Sequences</i> <i>Partition</i> <i>Take away or find the difference</i> <i>Less than/ greater than</i> <i>Proper fractions</i> <i>Ones</i> <i>Tenths</i> <i>Hundredths</i> <i>Equivalent</i> <i>Partition</i>	<i>Altogether</i> <i>Decimal places</i> <i>Value</i> <i>Digit</i> <i>Greatest difference</i> <i>Less than or greater than</i> <i>Ascending/ descending</i> <i>Ordering</i> <i>Rounding</i> <i>Nearest whole number / tenth</i>	<i>Common equivalent fraction</i> <i>Partition</i> <i>Integer / whole number</i> <i>Repeated addition</i> <i>Unit fraction</i> <i>Fraction of an amount.</i> <i>Quantity/ measure</i> <i>Non-unit fraction</i> <i>Parts/ groups</i> <i>Commutativity</i> <i>Place value</i> <i>Decimals</i> <i>Value</i> <i>Digits</i> <i>Partitioning</i> <i>Ones/ tenths/ hundredths/ thousandths</i> <i>Decimal point</i> <i>Columns</i>	<i>One whole</i> <i>Exchange</i> <i>Add/ subtract</i> <i>Complements</i> <i>Sum</i> <i>Number bonds</i> <i>Represents</i> <i>Bridging</i> <i>Position</i> <i>Largest sum/ Smallest sum</i> <i>Predict</i> <i>Rounding</i> <i>Estimating</i> <i>Checking/ Inverse</i> <i>Place holder</i> <i>Sensible estimate/ answer</i> <i>Efficient methods</i> <i>Increasing/ decreasing</i> <i>Decimal sequences</i> <i>Multiplying/ dividing</i>	<i>Columns</i> <i>Values</i> <i>Digits</i> <i>Exchanging</i> <i>Smaller</i> <i>Larger</i> <i>Partitioning</i> <i>Moving digits</i> <i>Multiples</i> <i>Represented</i> <i>Identity</i> <i>Direction</i> <i>Place holder</i> <i>Patterns</i> <i>Relationships</i> <i>Integer</i> <i>Product</i>	<i>Compound percentages</i> <i>Lots of</i> <i>Increase</i> <i>Decrease</i> <i>Original price</i> <i>New cost</i> <i>Proportions</i> <i>Ascending</i> <i>Descending</i> <i>Less than/ greater than or equal</i>
Measurement	<p>Measure and begin to record lengths and heights.  To compare, describe and solve practical problems for length and height.  To measure and begin to record mass/weight, capacity and volume.  To compare, describe and solve practical problems for mass and weight, capacity and volume.  Recognise and know the value of different denominations of coins and notes.  Sequence events in chronological order.  Recognise and use language relating to dates.  Tell the time to the hour and half past and draw the hands.  Compare, describe and solve practical time problems.  Measure and begin to record time.</p>	<p>Recognise and use symbols for £ and p and combine.  Find different combinations of coins to equal the same amount of money.  Solve simple problems involving adding and subtracting money and giving change.  Choose and use appropriate standard units to estimate and measure length and height in m and cm, mass in kg and g, temperature in degrees, capacity in l and ml to the nearest appropriate unit.  Compare and order lengths, mass, volume, capacity and record the results using &gt; &lt; and =  Tell and write the time to five minutes including quarter past and to.  Know the number of minutes in an hour and hours in a day.  Compare and sequence intervals of time.</p>	<p>Add and subtract amounts of money to give change, using both £ and p in practical contexts.  Measure, compare, add and subtract lengths in m/cm/mm, mass kg/g and volume and capacity ml/l.  Measure the perimeter of simple 2D shapes.  Tell and write the time from an analogue clocking, including Roman numerals, and 12- and 24-hour clocks.  Estimate and read time to the nearest minute.  Record and compare time in terms of minutes, seconds and hours.  Use vocabulary such as o'clock, a.m./p.m., midnight, noon, morning and afternoon.  Know the number of seconds in a minute and the number of days in each month, year and leap year.  Compare durations of events.</p>	<p>Measure and calculate the perimeter of a rectilinear figure in cm and m.  Convert between different units of measure.  Find the area of rectilinear shapes by counting squares.  Estimate, compare and calculate different measures including money in pounds and pence.  Solve simple measure and money problems involving fractions and decimals.  Convert between different units of measure including hour to minute.  Read, write and convert time between analogue and digit 12- and 24-hour clocks.  Solve problems involving converting time from hours to minutes, minutes to seconds, years to months and weeks to days.</p>	<p>Measure and calculate the perimeter of composite rectilinear shapes in cm and m.  Calculate and compare the area of rectangles and use standard units.  Estimate the area of irregular shapes.  Convert between units of metric measure.  Understand and use approximate equivalences between metric units and imperial units.  Solve problems including converting between units of time.  Estimate volume.  Use all four operations to solve problems involving measure.</p>	<p>Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3dp.  Use, read, write and convert between standard units, converting measurements of mass, length, volume and time.  Convert between miles and kilometres.  Recognise that shapes with the same areas can have different perimeters.  Recognise when formulae can be used to find area and volume.  Calculate the area of parallelograms and triangles.  Calculate, estimate and compare volume of cubes and cuboids.</p>			

Tier 3 Vocabulary	<p>Long/ Short Shorter/ Longer Tall/ Small Taller/ Smaller Length Comparing Describing Height Measuring Equal Same/ Different Non-standard Standard units Ruler Centimetre (cm) Weight/ Mass Coins Value Pounds Pence Worth Note Largest Smallest Today Yesterday Tomorrow Days/ Months Clock Hand/ Faces Hour/minute Half past Faster/slower</p> <p><i>Balance scales Heavier/ lighter Level/ up/ down Predict Equal Weigh more or less Bigger/ smaller Non-standard units/ standard units Balanced Investigate More or less Same as Less than/ greater than Ascending order/ descending order Capacity Volume Full/ nearly full/ empty/ nearly empty Half full Quarter full Tallest/ shortest Containers Sort/ Order Before/ After Morning/ Afternoon/ Evening First/ Next</i></p>	<p><i>Pounds £ and pence "p" Symbols Coins Silver and bronze Totals Quickest/ most efficient way &lt; &gt; or = for comparisons Greatest totals and lowest totals Odd and even Altogether Amount Exchange Represented Strategy Change Estimate Comparisons Partitioning Regrouping Spending Cost How much more? Less? Fewer? Hour/ Clock Minute/ Hand Half past Quarter past/to Intervals Seconds and hours/ Days Duration</i></p> <p><i>One and two step problem Give and receive Measure Tape/ Ruler Height/ Length Cm/ m Long/ taller/ taller/ shorter/ longer/ shortest/ longest/ tallest Appropriate Efficient Equipment Metre stick Trundle wheel Order Ascend/Descend Estimate Double/ half Weight/ Mass Heavier/lighter Scales/ balance Units Greater/ less than Volume/ capacity Full/empty Quarter/half/three quarters MI and I Degrees centigrade Thermometers Temperature</i></p>	<p><i>Coins/ Notes Pound/ Pence Value Represent Total amount Greatest /least Convert Combinations Worth boundaries Efficient Partition Spend Change Cheaper More expensive Minus Millimetres Metres Measure Equipment Unit/ non-unit Same/ different Length/ Height Equivalent measurements Convert Long/ longer/ longest Short/ shorter/ smallest Bigger/ smaller Represents Intervals</i></p> <p><i>Compare/Order Estimate Nearest unit Ascending/ descending order distances difference perimeter missing sides Year/ months Leap years Dates/ birthdays Calendar Earliest/ latest Hours/seconds Noon/ midday/ midnight Am/ pm Week/ month Analogue/ digital Roman numeral Past/ too Minute hand/ hour hand AM/ PM Time table Later/ earlier 24 hour time Start/ finish Quickest/ smallest Longest/ shortest Clockwise/ anticlockwise</i></p>	<p><i>Metre/ centimetre/ millimetre/ kilometre More or less Measure Convert Double/ halve Distance Length/ width Perimeter Rectilinear shapes Arrangements Longest/ shortest Calculation Dimensions Odd/ even Opposite Area Shape Surface Smaller/larger Surface area Measurement Exact fit Biggest/Smallest Rectilinear Centimetre Cm Cm<sup>2</sup> Square metres Overlap Identical/ different Arrange</i></p> <p><i>Symmetry Greater than/ less than Ascending order Descending order Patterns Pounds Pence Decimal notation Money Partition Convert How much? How many? Odd / even Total Multiple/ factor Compare Order Represent Tenth/ hundredth Ascending/ descending Larger/ smaller Greater/ less than Coins Notes Approximate Estimate Rounding Values Combinations Change Price</i></p>	<p><i>Area Perimeter Rectilinear Diagrams Dimension Difference Measurements Units Opposite Double/ halve Missing 2D shape names Composite Km and m/ g and kg / m and ml Convert Distance Milli- Centi- Unit of measure Shape Conversions Imperial units Approximate Months/ weeks/ days Hours/ minutes/ seconds Timetables</i></p> <p><i>Construct Regular/ irregular Length Width Identical Total area Order Approximate Compound shapes Formula Estimate Volume Capacity Cm cubed Estimate</i></p>	<p><i>Metric measures Length/Weight Capacity Unit Appropriate Measure Estimate Volume Height Cm/ m/ mm/ g/ kg/ tonnes/ l/ ml/ km Time table Fractions Closest / furthest Convert Place holder Efficient method Multiply/Divide Shortest to longest Ascending/ descending Operation Approximately Imperial measures Foot/ inch/ ounce/ pounds / stone. Pint/ gallons Rectilinear shapes Area Perimeter</i></p> <p><i>Factors Predict Length Width Cm and cm squared Carroll diagram Venn diagram Smallest/ largest Formula Same/ different Greatest Approximating. Estimating Parts/ wholes Right- angled triangle Perpendicular Horizontal Vertical Equilateral triangle Scalene triangle Isosceles triangle Parallelogram Base Dimensions Volume Cubic units Solid Length/width and height</i></p>
Properties of shape	<p>Recognise and name common 2-D shapes.</p> <p>Recognise and name common 3-D shapes.</p>	<p>Identify and describe the properties of 2D shapes.</p> <p>Identify and describe the properties of 3D shapes.</p> <p>Identify 2D shapes on the surface of 3D shapes.</p> <p>Compare and sort common 2D and 3D shapes and everyday objects.</p>	<p>Measure the perimeter of simple 2D shapes.</p> <p>Recognise angles as a property of a shape or description of a turn.</p> <p>Identify right angles and whether angles are greater or less.</p> <p>Identify horizontal, vertical and pairs of perpendicular and parallel lines.</p> <p>Draw 2D and make 3D shapes.</p> <p>Recognise 3D shapes in different orientations and describe them.</p>	<p>Identify acute and obtuse angles and compare and order angles up to two right angles by size.</p> <p>Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.</p> <p>Identify lines of symmetry in 2D shapes presented in different orientations.</p> <p>Complete a simple symmetric figure.</p>	<p>Identify 3D shapes from 2D representations.</p> <p>Use the properties of rectangles to deduce related facts and find missing lengths and angles.</p> <p>Distinguish between regular and irregular polygons.</p> <p>Know angles are measured in degrees, estimate and compare acute, obtuse and reflex angles. Draw angles and measure them. Identify angles at a point, on a straight line and other multiples of 90.</p>	<p>Draw 2D shapes using given dimensions and angles.</p> <p>Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals and regular polygons.</p> <p>Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.</p>

Tier 3 Vocabulary	<p>3D shapes - Cuboid, Cube, Pyramid, Spheres, Cylinders and Cones Similarities Differences Model Shadows Faces Vertices Edges Size Orientation Colours Groups</p>	<p>Sorted Straight faces Curved surfaces Circular face Square face Large and small shapes 2D shapes – triangles, squares, rectangles and circles Length Width Patterns Repeating</p>	<p>Shape 3D 2D Orientations Vertical/ horizontal line Halved rectangle/ circle Pentagon/octagon n/hexagon/ quadrilateral/ heptagon Cube/cone/cylinder/ cuboid/ pyramid/ triangular prism Flat Sides (2D) Straight sides and curved sides Irregular shape Regular shape Vertices/ vertex / corners (2D and 3D shapes)</p>	<p>Rotate Same/different Bigger/smaller Symmetry Vertical/ horizontal line Halved rectangle/ circle Sorting Venn diagram Patterns Repeating Curved surface Nets Apex</p>	<p>Measure Turn Clockwise Anti-clockwise Angle Direction Quarter turn/ half term Compass points Right angles Horizontal</p>	<p>Vertical Acute Obtuse Measure Cm/ mm Parallel Perpendicular Symmetry Faces/vertices/ edges</p>	<p>Turns Angles Anti-clockwise Clockwise Direction Compass points Right angles Obtuse and acute angles Degrees</p>	<p>Estimate Vertical Horizontal Symmetry Perpendicular Parallel Polygon Isosceles/scalene / equilateral Quadrilateral</p>	<p>Acute Obtuse Right angle Angle 360 degrees Turn Whole turn/ half turn/ quarter turn 180 degrees, 90 degrees, 45 degrees, 135 degrees and 270 degrees. Reflex angles Fractions of a whole Angles on a clock Compass point/ Turns North/east/west/south Clockwise and anti-clockwise Protractor Estimation Scales Size</p>	<p>Cm and mm Accurate Factors/ multiples Straight line Horizontal/ vertical/ diagonal Parallel and perpendicular Missing angles/ sides Efficient Composite shape Perimeter/ area Rectilinear Regular and irregular polygons Sides/ lengths/ vertices Equal/ not equal 2D and 3D (curved surfaces) Shadows/ projections and elevations Opposite Nets</p>	<p>Protector Sizes Angles Compass points Right angle/ obtuse/ acute/ reflex Degrees Quadrilateral Turns/ rotate Whole/ half/ quarter and three-quarter turns Clockwise and anti-clockwise Angles on a line and around a point Pie charts Opposite angles</p>	<p>Vertical Horizontal Perpendicular Parallel Internal angles Equilateral/ isosceles/ scalene/ right angled triangle Quadrilateral/ square/ rhombus Parallelogram/ trapezium/ isosceles trapezium Polygons/ regular/ irregular 2D and 3D shapes Net</p>
Position and direction	<p>Describe position, direction and movement, including whole, half, quarter and three-quarter turns.</p>	<p>Use mathematical vocabulary to describe position, direction and movement including rotation as a turn and in terms of right angles. Order and arrange combinations of mathematical objects in patterns and sequences.</p>		<p>Describe positions on a 2D grid as coordinates in the first quadrant. Plot specified points and draw sides to complete a given polygon. Describe movements between positions as translations of a given unit to the left/right and up/down.</p>	<p>Identify, describe and represent the position of a shape following a reflection or translation.</p>	<p>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.</p>						
Tier 3 Vocabulary	<p>Full Half Quarter Three quarter Turns Shapes /objects. quarter turn half turn three quarters turn full turn direction left</p>	<p>right forwards backwards position movement middle top in between bottom above below</p>	<p>Forwards Backwards Up Down Left Write 2D grids Direction Moving Facing Position</p>	<p>Routes Turn Rotation Shape Quarter/ half/ full Clockwise and anti-clockwise Efficient Pattern Repeating pattern</p>	<p>Coordinates Position Quadrant x-axis y-axis brackets</p>	<p>plot left/right/up/down translation up/down vertices</p>	<p>Position Coordinates First quadrant x-axis/y-axis grid translation dimensions symmetry</p>	<p>orientation reflection mirror line vertical/ horizontal parallel perpendicular</p>	<p>Coordinates Plotting 2D grids Vertices Axis Horizontal Vertical Quadrant Polygon</p>	<p>Regular/ irregular Positive/ negative Y or x Vertex Translate Rotate Reflect</p>		
Statistics		<p>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</p>	<p>Interpret and present data using bar charts, pictograms and tables.  Solve one-step and two-step questions using information</p>	<p>Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.</p>	<p>Solve comparison, sum and difference problems using information presented in a line graph.</p>	<p>Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.</p>						

		category and sorting the categories by quantity.  Ask and answer questions about totalling and comparing categorical data.	presented in scaled bar charts and pictograms and tables.	Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	Complete, read and interpret information in tables including timetables.	Interpret and construct pie charts and line graphs and use these to solve problems.  Calculate the mean as an average.					
Tier 3 Vocabulary		<i>Total</i> <i>Counting</i> <i>Altogether</i> <i>More</i> <i>Less</i> <i>Different</i> <i>Tally charts</i> <i>Systematic</i> <i>Recording</i> <i>Quantity</i> <i>Represent</i> <i>Mark/tally</i> <i>Efficient</i> <i>Least</i> <i>Favourite</i> <i>Times more</i> <i>Popular</i>	<i>Too many</i> <i>Not enough</i> <i>Column</i> <i>Row</i> <i>Pictogram</i> <i>Horizontally</i> <i>Vertically</i> <i>Symbol</i> <i>Compare</i> <i>How many more?</i> <i>Most/least</i> <i>popular?</i> <i>Scale</i> <i>Axis</i> <i>X-axis</i> <i>y-axis</i> <i>label</i>	<i>Pictograms</i> <i>Read</i> <i>Interpret</i> <i>Data</i> <i>Comparisons</i> <i>Symbol</i> <i>Half-symbol and quarter-symbol</i> <i>Greatest/smallest</i> <i>Most/ least</i> <i>Times as many or twice as many</i>	<i>More/ less</i> <i>Bar chart</i> <i>Scale</i> <i>X and y-axis</i> <i>Most/ least</i> <i>popular</i> <i>Difference</i> <i>One-step/ two-step and multi-step problems</i> <i>Total</i>	<i>Bar charts</i> <i>Pictograms</i> <i>Tables</i> <i>Interpret</i> <i>Present</i> <i>Discrete</i> <i>Data</i> <i>Scale</i>	<i>Tally</i> <i>Represent</i> <i>Half./quarter/three quarts</i> <i>Line graphs</i> <i>Continuous data</i> <i>Estimates</i> <i>X and y axis</i>	<i>Line graphs</i> <i>Scales</i> <i>Vertical/horizontal</i> <i>Axis</i> <i>Information</i> <i>Represents</i> <i>Lowest/ highest</i> <i>Estimate</i> <i>Temperature</i> <i>How many more?</i> <i>Altogether</i> <i>Find the difference</i> <i>Negative</i>	<i>Comparisons</i> <i>Activity</i> <i>Intervals</i> <i>Effect</i> <i>How long?</i> <i>Accurate</i> <i>Two way tables</i> <i>Combined</i> <i>population</i> <i>Timetable</i> <i>Row</i> <i>Column</i> <i>Displayed</i>	<i>Line graphs</i> <i>Scales</i> <i>x-axis</i> <i>y-axis</i> <i>accurate</i> <i>discrete data</i> <i>continuous data</i> <i>intervals</i> <i>data</i> <i>misleading</i> <i>vertical</i> <i>horizontal</i> <i>calculate</i> <i>circles</i>	<i>radius</i> <i>diameter</i> <i>centre</i> <i>circumference</i> <i>pie chart</i> <i>fractions</i> <i>angles</i> <i>percentages</i> <i>degrees</i> <i>frequency</i> <i>mean</i> <i>median</i> <i>mode</i> <i>range</i>
Ratio and proportion						<p>Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</p> <p>Solve problems involving similar shapes where the scale factor is known or can be found.</p> <p>Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.</p>					
Tier 3 Vocabulary						<i>Ratio</i> <i>Relationship</i> <i>Related</i> <i>Values</i> <i>Comparisons</i> <i>Quantities</i> <i>Compare</i> <i>More</i> <i>Less</i> <i>For every...</i> <i>Proportion</i> <i>Fractions</i>	<i>Notion</i> <i>Symbol</i> <i>Order share</i> <i>Part/ whole</i> <i>Scale</i> <i>Scale factors</i> <i>Enlargement</i> <i>Increased</i> <i>Decreased</i> <i>Doubled/ tripled</i> <i>Perimeter/ area</i> <i>Length/ width</i> <i>Larger/ smaller</i>				

Algebra						<p><b>Algebra</b>          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.</p>																																		
Tier 3 Vocabulary						<table border="0"> <tr> <td><i>Rule</i></td> <td><i>Formula</i></td> </tr> <tr> <td><i>One step/ two-step/ multi-step</i></td> <td><i>Stands for</i></td> </tr> <tr> <td><i>Function machine</i></td> <td><i>Area</i></td> </tr> <tr> <td><i>Input/ output</i></td> <td><i>Perimeter</i></td> </tr> <tr> <td><i>Operation</i></td> <td><i>One-step or multi-step equations</i></td> </tr> <tr> <td><i>Value</i></td> <td><i>Balancing method</i></td> </tr> <tr> <td><i>Algebraic expressions</i></td> <td><i>Inverse operation</i></td> </tr> <tr> <td><i>Algebraic rule</i></td> <td><i>Variables</i></td> </tr> <tr> <td><i>Trial and error</i></td> <td><i>Satisfy</i></td> </tr> <tr> <td><i>Pattern</i></td> <td><i>Integers</i></td> </tr> <tr> <td><i>Differences</i></td> <td><i>Possibilities</i></td> </tr> <tr> <td><i>Tables</i></td> <td><i>Multiples/ factors</i></td> </tr> <tr> <td><i>Substitute</i></td> <td><i>Enumerate</i></td> </tr> <tr> <td><i>Represents</i></td> <td><i>possibilities</i></td> </tr> <tr> <td><i>Symbols/ letters</i></td> <td><i>Strategies</i></td> </tr> <tr> <td><i>4 operations</i></td> <td><i>Combinations</i></td> </tr> <tr> <td></td> <td><i>Solutions</i></td> </tr> </table>	<i>Rule</i>	<i>Formula</i>	<i>One step/ two-step/ multi-step</i>	<i>Stands for</i>	<i>Function machine</i>	<i>Area</i>	<i>Input/ output</i>	<i>Perimeter</i>	<i>Operation</i>	<i>One-step or multi-step equations</i>	<i>Value</i>	<i>Balancing method</i>	<i>Algebraic expressions</i>	<i>Inverse operation</i>	<i>Algebraic rule</i>	<i>Variables</i>	<i>Trial and error</i>	<i>Satisfy</i>	<i>Pattern</i>	<i>Integers</i>	<i>Differences</i>	<i>Possibilities</i>	<i>Tables</i>	<i>Multiples/ factors</i>	<i>Substitute</i>	<i>Enumerate</i>	<i>Represents</i>	<i>possibilities</i>	<i>Symbols/ letters</i>	<i>Strategies</i>	<i>4 operations</i>	<i>Combinations</i>		<i>Solutions</i>
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