

Oak Meadow Primary School

Ryan Avenue, Ashmore Park, Wolverhampton, WV11 2QQ, 01902 558517, oakmeadowprimaryschool@wolverhampton.gov.uk



Policy: Mathematics

From tiny acorns mighty oaks grow.

Approval Date:	
Signature:	
Review Date:	

Policy Name: Mathematics

Policy Author: David Clarkson

Creation Date: 10/12/19

Review Date: 10/12/21

Contents

Page

Curriculum Statement	3
Skills Progression	4
Assessment	4
Early Years	4
Cross – Curricular Links	4
SMSC Development	5
Diversity	5
Planning and Resources	5
Subject Essentials	5
Role of the Subject Leader	6
Equal Opportunities	6
Inclusion	6
Role of the Governors	7
Health and Safety	7

Curriculum Statement - Mathematics

Intent

At Oak Meadow we believe that Mathematics teaches children how to make sense of the world around them through developing their ability to calculate, reason and solve problems. It enables children to understand relationships and patterns in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics. We view mathematics as a creative and highly interconnected subject essential to everyday life, science, technology and engineering, and necessary for most forms of employment.

Through the teaching of mathematics, we aim:

- to promote enjoyment of learning through practical activity, exploration and discussion.
- to provide children with the ability to recall and apply knowledge rapidly and accurately to a range of mathematical problems and situations.
- to promote confidence and competence with numbers and the number system.
- to develop the ability to solve problems through decision-making and reasoning in a range of contexts.
- to develop a practical understanding of the ways in which information is gathered and presented.
- to explore features of shape and space, and develop measuring skills in a range of contexts.
- to understand the importance of mathematics in everyday life.

Implementation

Mathematics at Oak Meadow is taught in blocks throughout the year, so that children can achieve depth in their learning. The programmes of study for mathematics are set out weekly and teachers follow the small step sequence of planning from the White Rose primary schemes of learning. Lessons reinforce skills, challenge pupils' reasoning and develops their problem solving expertise. The lessons provide three stages of challenge to learning through an 'All, Most and Some' approach which develop varied fluency, reasoning and problem solving. Children consolidate the skills they are learning whilst developing their reasoning skills and are provided with further problem solving opportunities in which they are required to justify and explain their learning using appropriate mathematical language and terms. Through the use of concrete resources, the concepts of subitising and conservation of number are secured. The pupils' understanding is extended through relating the 'concrete' stage to the 'pictorial' step. Through using pictures and visual representations, the pupils develop a deep understanding of number and mathematical concepts. Relating this to numbers and mathematical operations involves the 'abstract' stage in which the concrete (practical resources) along with the pictorial representations relates to the numbers we see in calculations.

Impact

One of our principal aims is to develop children's knowledge, skills and understanding. During our daily lessons, we encourage children to ask as well as answer mathematical questions. They have the opportunity to use a wide range of resources, such as number lines, number squares, digit cards, place value counters, base ten, Numicon and small

apparatus to support their work. Mathematical dictionaries are available. ICT is used in mathematics lessons for modelling ideas and methods. Wherever possible, we encourage the children to apply their learning to everyday situations.

Skills Progression

Teachers have identified the key knowledge and skills of each blocked topic and consideration has been given to ensure progression across topics throughout each year group across the school. See Appendix 1 for KS1 and KS2 Maths Skills Progression.

Assessment

Assessment for learning is continuous throughout the planning, teaching and learning cycle. Key mathematical skills are taught to enable and promote the development of children's mathematical understanding. Children in each year group have a maths target sheet for their age related maths targets inside the front cover of their book. This helps to track the children's acquisition and application of key skills through the varied fluency, reasoning and problem solving approaches. Assessment is also supported by use of the following strategies:

- Observing children at work, individually, in pairs, in a group and in class during whole class teaching.
- Using differentiated, open-ended questions that require children to explain and unpick their understanding.
- Providing effective feedback, including interactive marking through next steps questions where appropriate, to engage children with their learning and to provide opportunities for self-assessment, consolidation, depth and target setting.
- Book moderation and monitoring of outcomes of work, to evaluate the range and balance of work and to ensure that tasks meet the needs of different learners, with the acquisition of the pre-identified key knowledge of each topic being evidenced through the outcomes.

At the end of each topic, the acquisition of skills is tested using White Rose Hub materials. At the end of each term, the White Rose Hubs materials (end of term tests) are used and the strengths/areas for development are shared with the Senior Leaders. Each child's attainment and progress in mathematics is formally reported to parents at the end of each term. National Curriculum tests are used at the end of KS1 and 2; teachers use past and sample papers to inform their assessments as they prepare pupils for these assessments. Year Four pupils will also undertake the National Multiplication Tables Check.

Early Years

'Every child deserves the best possible start in life and the support that enables them to fulfil their potential.' (Statutory framework for the early years foundation stage)

Mathematics is one of the areas of learning and development set out in the statutory framework for the Early Years. 'Mathematics involves providing children with opportunities to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems; and to describe shapes, spaces, and measures.'

At Oak Meadow, we have a firm belief in the acquisition of number skills which will enable children to use their deep learning in order to perform simple skill with numbers and to reason about numbers. They will be able to use their number skills to solve simple problems.

The statutory framework states:

‘Numbers: children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.’ For this reason, we teach the children their numbers in stages, beginning with a focus on numbers to five. Children will understand the sequence of numbers, how to count up and down in steps of one, how to match them to their respective amounts, one more than and one less than, recognising an amount without counting to five quickly (known as subitising) Children will use a variety of apparatus to achieve this including everyday objects, counters, dice, cubes, number frames (ten frames) Numicon, pictures, and number tracks.

The framework continues:

‘Shape, space and measures: children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.’ Through a rich, varied enquiry approach with child initiated learning, children will explore everyday objects and contexts to support shape, space and measures and will be taught the language of these concepts.

Cross – Curricular Links

Mathematics is a subject that touches on many other areas taught in our school.

The teaching of mathematics contributes significantly to children’s understanding of English in our school by actively promoting the skills of reading, writing, speaking and listening. For example, in mathematics lessons we expect children to read and interpret problems, in order to identify the mathematics involved. In English lessons, too, maths can contribute: younger children enjoy stories and rhyme that rely on counting and sequencing, while older children encounter mathematical vocabulary, graphs and charts when reading non-fiction texts.

Information and communication technology enhances the teaching of mathematics significantly, because IT is particularly useful for mathematical tasks. Teachers can use software to present information visually, dynamically and interactively, so that children understand concepts more quickly. Younger children use IT to communicate results with appropriate mathematical symbols. Children use it to produce graphs and tables when explaining their results, or when creating repeating patterns, such as tessellations. When working on control, children can use both standard and non-standard measures for distance and angle. They can also use simulations to identify patterns and relationships.

SMSC Development

Spiritual development in mathematics

The study of mathematics enables pupils to make sense of the world around them and we strive to enable each of our pupils to explore the connections between their numeracy skills and every-day life. Developing deep thinking and an ability to question the way in which the world works promotes the spiritual growth of pupils. Pupils are encouraged to see the sequences, patterns, symmetry and scale both in the man-made and the natural world and to use maths as a tool to explore it more fully.

Moral development in mathematics

The moral development of pupils is an important thread running through the mathematics

curriculum. Pupils are provided with opportunities to use their maths skills in real life contexts, applying and exploring the skills required in solving various problems. All pupils are made aware of the fact that the choices they make lead to various consequences. They must then make a choice that relates to the result they are looking for. The logical aspect of this relates strongly to the right/wrong responses in maths.

Social development in mathematics

Problem solving skills and teamwork are fundamental to mathematics through creative thinking, discussion, explaining and presenting ideas. Pupils are always encouraged to explain concepts to each other and support each other in their learning. In this manner, pupils realise their own strengths and feel a sense of achievement which often boosts confidence. Over time they become more independent and resilient learners.

Cultural development in mathematics

Mathematics is a universal language with a myriad of cultural inputs throughout the ages. Various approaches to mathematics from around the world are used and this provides an opportunity to discuss their origins. We try to develop an awareness of both the history of maths alongside the realisation that many topics we still learn today have travelled across the world and are used internationally.

Diversity

Through mathematics, children learn about the diversity of national, regional, religious and ethnic identities; teachers encourage pupils to think about topical political, spiritual, moral, social and cultural issues, problems and events and to use their imagination to consider other people's experiences.

Planning and Resources

Planning is achieved collaboratively with parallel-class teachers and SMART board plans are saved electronically for ease of access. Teachers have identified the key knowledge and key vocabulary that is being taught, as well as the skills that are being developed across each topic. These are also explicitly outlined on each topic medium term plan, which makes explicit links to the national curriculum 2014. The subject topics within mathematics each have detailed objectives and sequence of small steps, again saved electronically to enable staff to access planning structures.

Planning uses the model of the White Rose Hubs materials and follows the fluency, reasoning and problem solving pathway. Staff plan the sequence of teaching to enable the children to elicit their understanding through the use of manipulatives (apparatus) visual representations and abstract (numbers).

Each classroom will be resourced with materials to support the delivery of Maths; such items might include number lines, multiplication tables, 100 squares, 2D and 3D shapes, multilink cubes, Numicon, counting rods, place value apparatus, dice and other smaller items. Larger materials such as scales, trundle wheels and measuring cylinders will be held centrally in the store cupboards adjacent to the staffroom. Children should be encouraged to use whatever resources are available to them in the classroom and which they feel would be beneficial to help them when completing Maths work. Each classroom should have a display dedicated to Maths; this could be in the form of a working wall, strategy board or problem solving area and pupil voice should be evident.

Children can also use ICT resources, remotely enabling parents to become involved in their child's learning.

My Maths

My Maths, a fully interactive online mathematics learning tool for children is used by teachers to support mathematics learning both in class and at home. Children can be set

homework on My Maths and are encouraged by school to access it regularly at home to support areas of mathematical learning.

Times Tables Rockstars

Times Tables Rockstars is another online resource which supports the acquisition of multiplication and division facts rapid recall. Children are encouraged to access this regularly as it supports the teachers' assessment of times tables recall.

Subject Essentials

The specific requirements for the teaching and learning of mathematics is outlined in the document "Subject Essentials Maths 2019 – 2020" (See appendix 2).

Role of the Subject Leader

The subject leader's responsibilities are:

- To ensure a high profile of the subject.
- To ensure a full range of relevant and effective resources are available to enhance and support learning.
- To model the teaching of mathematics.
- To ensure progression of the key knowledge and skills identified within each unit and that these are integral to the programme of study and secure at the end of each age phase.
- To monitor books and ensure that key knowledge is evidenced in outcomes, alongside and as supported, by SLT.
- To monitor planning and oversee the teaching of mathematics.
- To lead further improvement in and development of the subject as informed by effective subject overview.
- To ensure that mathematics has a positive effect on all pupils, including those who are disadvantaged or have low attainment.
- To ensure that approaches are informed by and in line with current identified good practice and pedagogy.

Equal Opportunities

At Oak Meadow, we are committed to providing a teaching environment which ensures all children are provided with the same learning opportunities regardless of social class, gender, culture, race, special educational need or disability. Teachers use a range of strategies to ensure inclusion and also to maintain a positive ethos where children demonstrate positive attitudes towards others. Support for specific individuals is well considered and planned for, with consideration given to how greater depth and further challenge can be provided for and demonstrated by children who require further challenge.

Inclusion

All pupils are entitled to access the mathematics curriculum at a level appropriate to their needs. Mathematics forms part of the school curriculum policy to provide a broad and balanced education to all children. Through our mathematics teaching, we provide learning opportunities that enable all pupils to make good progress. We strive hard to meet the needs of those pupils with special educational needs, those with disabilities, those who are gifted and talented and those learning English as an additional language, and we take all reasonable steps to achieve this. To ensure inclusion, teachers use a range of strategies in line with the school's inclusion planning key. Independent tasks, as well as teaching, are

also well-adapted to ensure full accessibility, as well as to provide appropriate challenge to different groups of learners. The school makes full use of additional adults who are deployed effectively to ensure that identified children are able to make progress in each curriculum area, according to their full potential.

Role of the Governors

Governors are responsible for ensuring the effective delivery of the National Curriculum requirements in mathematics. The subject leader will ensure that the Governing Body is kept up to date with the actions and initiatives which are relevant to the subject. Regular reviews of action plans are sent to the governors throughout the year and the governors meet with subject leaders and provide link governor reports to the governing body annually.

Health and Safety

The curriculum will be delivered in a safe and healthy manner and every effort will be taken to identify risks associated with a curriculum subject/activity (such as maths trails, outdoor mathematical learning opportunities) and the appropriate control measures will be implemented. Pupils will be educated about health and safety issues as and when the opportunity arises throughout the course of normal teaching. Risk assessments will be submitted for all educational off site visits via the Evolve system at least 5 days prior to the visit taking place.

Oak Meadow Skills Progression

EYFS, Key Stage 1 and Key Stage 2

Subject Area: Maths



	EYFS	Year 1 and Year 2		Year 3 and Year 4		Year 5 and Year 6	
Mathematical Vocabulary	<p>To build up vocabulary that reflects the breadth of their experiences.</p> <p>To extend vocabulary, especially by grouping and naming, exploring the meaning and sounds of new words.</p>	<p>To read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at year 1.</p> <p>To read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.</p>		<p>To read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.</p> <p>To read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.</p>		<p>To read, spell and pronounce mathematical vocabulary correctly.</p> <p>To read, spell and pronounce mathematical vocabulary correctly.</p>	
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Counting

<p>To recite numbers in order to 10.</p> <p>To realise not only objects, but anything can be counted including steps, claps or jumps.</p> <p>To count up to three or four objects by saying one number name for each item.</p> <p>To count out up to six objects from a larger group.</p> <p>To count actions or objects which cannot be moved.</p> <p>To count objects to 10 and beginning to count beyond 10.</p> <p>To count an</p>	<p>To count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.</p> <p>To identify one more and one less than a given number.</p> <p>To count in multiples of twos, fives and tens from different multiples to develop their recognition of patterns in the number system, including varied and frequent practice through increasingly complex questions.</p> <p>To recognise and create repeating patterns with objects and with shapes.</p>	<p>To count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward.</p>	<p>To continue to count in ones, tens and hundreds, so that pupils become fluent in the order and place value of numbers to 1000.</p> <p>To count from 0 in multiples of 4, 8, 50 and 100.</p>	<p>To count in tens and hundreds, and maintain fluency in other multiples through varied and frequent practice.</p> <p>To count in multiples of 6, 7, 9, 25 and 1000.</p> <p>To count backwards through zero to include negative numbers.</p> <p>To find 1000 more or less than a given number.</p>	<p>To count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.</p> <p>To interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero</p>	<p>To use negative numbers in context, and calculate intervals across zero.</p>
--	---	--	--	---	---	---

	<p>irregular arrangement of up to ten objects.</p> <p>To estimate how many objects they can see and check by counting them.</p> <p>To count reliably with numbers from one to 20.</p>						
Identify, represent numbers	<p>To say the number that is one more than a given number.</p> <p>To find one more or one less from a group of up to five objects, then ten objects.</p> <p>To say which number is one more or one less than a given number from one to 20.</p>	To identify, represent and estimate numbers using different representations, including the number line	To identify, represent and estimate numbers using different representations	To identify, represent and estimate numbers using different representations			

<p>Reading and Writing Numbers</p>	<p>To show an interest in numerals in the environment.</p> <p>To use some number names accurately in play.</p> <p>To recognise some numerals of personal significance.</p> <p>To recognise numerals 1 to 5.</p>	<p>To read and write numbers from 1 to 20 in numerals and words.</p> <p>To count, read and write numbers to 100 in numerals</p>	<p>To read and write numbers to at least 100 in numerals and in words.</p>	<p>To read and write numbers up to 1000 in numerals and in words.</p>		<p>To read and write numbers to at least 1 000 000 and determine the value of each digit.</p>	<p>To say, read and write, numbers up to 10 000 000 accurately and determine the value of each digit.</p>
------------------------------------	---	---	--	---	--	---	---

Compare and Order Numbers	<p>To compare two groups of objects, saying when they have the same number.</p> <p>To use the language of 'more' and 'fewer' to compare two sets of objects.</p> <p>To place numbers one to 20 in order.</p>		<p>To compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs.</p>	<p>To compare and order numbers up to 1000.</p>	<p>To order and compare numbers beyond 1000.</p>	<p>To order and compare numbers to at least 1 000 000 and determine the value of each digit.</p>	<p>To order and compare numbers up to 10 000 000 accurately and determine the value of each digit.</p>
Understanding Place Value	<p>To show curiosity about numbers by offering comments or asking questions.</p>		<p>To recognise the place value of each digit in a two-digit number (tens, ones) to become fluent and apply their knowledge of numbers to reason with, discuss and solve problems.</p> <p>To begin to understand zero as a place holder.</p>	<p>To recognise the place value of each digit in a three-digit number (hundreds, tens, ones) and apply partitioning related to place value using varied and increasingly complex problems, building on work in year 2 (for example, $146 = 100 + 40$ and $6, 146 = 130 + 16$).</p>	<p>To recognise the place value of each digit in a four-digit number.</p> <p>To begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far.</p>	<p>To extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far.</p>	<p>To use negative numbers in context, and calculate intervals across zero.</p>

Rounding					<p>To round any number to the nearest 10, 100 or 1000.</p> <p>To connect estimation and rounding numbers to the use of measuring instruments.</p>	<p>To round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.</p>	<p>To round any whole number to a required degree of accuracy.</p>
Roman Numerals					<p>To 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.</p>	<p>To read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</p>	
Solve Problems	<p>To show an interest in number problems.</p> <p>To begin to identify own mathematical problems based on own interests and fascinations.</p>	<p>To practise ordinal numbers and solve simple concrete problems.</p>	<p>To use place value and number facts to solve related problems to develop fluency.</p>	<p>To solve number problems and practical problems involving these ideas.</p>	<p>To solve number and practical problems that involve all of the above and with increasingly large positive numbers.</p>	<p>To solve number problems and practical problems that involve all of the above.</p>	<p>To solve number and practical problems that involve all of the above.</p>

Addition and subtraction: Number bonds		To memorise, represent and use number bonds and related subtraction facts within 20.	<p>To recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships.</p> <p>To recall and use addition and subtraction facts to 20 to become fluent in deriving associative facts (e.g. $10 - 7 = 3$, $100 - 70 = 30$) and derive and use related facts up to 100.</p>				
--	--	--	--	--	--	--	--

Mental Calculations		<p>To add and subtract one-digit and two-digit numbers to 20, including zero</p> <p>To read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods)</p>	<p>To add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers <p>To show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot</p>	<p>To add and subtract numbers mentally, including:</p> <ul style="list-style-type: none"> * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds 		<p>To add and subtract numbers mentally with increasingly large numbers</p>	<p>To perform mental calculations, including with mixed operations and large numbers</p> <p>To use their knowledge of the order of operations to carry out calculations involving the four operations</p>
---------------------	--	---	---	---	--	---	---

Written Calculations		To read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs.	To begin to record addition and subtraction in columns to support place value and prepare for formal written methods with larger numbers.	To use the understanding of place value and partitioning to enable adding and subtracting numbers with up to three digits, using formal written methods of columnar addition and subtraction to become fluent.	To add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate.	To add and subtract whole numbers with more than four digits, including using formal written methods of columnar addition and subtraction fluently.	
Inverse Operations, Estimating and Checking Answers			To recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	To estimate the answer to a calculation and use inverse operations to check answers.	To estimate and use inverse operations to check answers to a calculation.	To use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.	To round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc..
Order of Operations							To use their knowledge of the order of operations to carry out calculations involving the four operations.

<p>Addition and subtraction: Solve Problems</p>	<p>To solve problems, including doubling, halving and sharing.</p>	<p>To discuss and solve one-step problems (in familiar practical contexts) that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems. Problems include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are able to use these operations flexibly.</p>	<p>To solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods.</p>	<p>To solve varied problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</p>	<p>To solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.</p>	<p>To solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p>	<p>To solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p> <p>To solve problems involving addition, subtraction, multiplication and division.</p> <p>To use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.</p>
---	--	--	---	---	---	---	---

Mental Calculations Multiplication and division			<p>To begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.</p> <p>To begin to relate multiplication and division facts to fractions and measures (e.g., $40 \div 2 = 20$, 20 is a half of 40).</p> <p>To show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot, to develop multiplicative reasoning.</p>	<p>To 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 efficient mental methods, for example, using commutativity and associativity, and progressing to formal reliable written methods of short multiplication and division.</p>	<p>To combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations, e.g. $2 \times 6 \times 5 = 10 \times 6 = 60$.</p> <p>To practise mental methods and extend this to three-digit numbers to derive associative facts, (e.g. $600 \div 3 = 200$ can be derived from $2 \times 3 = 6$).</p> <p>To recognise and use factor pairs and commutativity in mental calculations.</p> <p>To 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.</p>	<p>To multiply and divide numbers mentally drawing upon known facts.</p>	<p>To perform mental calculations, including with mixed operations and large numbers.</p>
---	--	--	---	---	--	--	---

Multiplication and Division Facts

To make connections between arrays, number patterns, and counting in twos, fives and tens. Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.

To use a variety of language to describe multiplication and division.

To count from 0 in multiples of 4, 8, 50 and 100.

To recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers and use them to solve simple problems, demonstrating an understanding of commutativity as necessary.

To connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face.

To recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables when they are calculating mathematical statements in order to improve fluency.

To connect the 2, 4 and 8 multiplication tables through doubling

To recall multiplication and division facts for multiplication tables up to 12×12 to aid fluency.

To write statements about the equality of expressions (for example, use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$).

To apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.

To continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.

Written Calculation Multiplication and Division			<p>To calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs.</p> <p>To begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.</p>	<p>To 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 efficient mental methods, for example, using commutativity and associativity, and progressing to formal reliable written methods of short multiplication and division. (included in mental calculation section)</p>	<p>To multiply two-digit and three-digit numbers by a one-digit number using the formal written layout of short multiplication with exact answers.</p> <p>To become fluent in the formal written method of short division with exact answers.</p>	<p>To multiply numbers up to four digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers fluently.</p> <p>To divide numbers up to four digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context fluently.</p> <p>To multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.</p>	<p>To multiply multi-digit numbers up to four digits by a two-digit whole number using the formal written method of long multiplication.</p> <p>To divide numbers up to four 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.</p> <p>To divide numbers up to four digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.</p>
---	--	--	---	--	---	---	---

Properties of numbers					recognise and use factor pairs and commutativity in mental calculations (repeated)	<p>To use and understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements.</p> <p>To identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.</p> <p>To know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.</p>	To identify common factors, common multiples and prime numbers.
Using the Inverse				<i>To estimate the answer to a calculation and use inverse operations to check answers.</i>	<i>To estimate and use inverse operations to check answers to a calculation.</i>		To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Solve Problems – multiplication and division		To solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	To solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	To solve simple problems in contexts, deciding which of the four operations to use and why. These include missing number problems, involving multiplication and division, including measuring and positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	To solve two-step problems in contexts 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.	To solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.	To solve problems involving addition, subtraction, multiplication and division. To use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
Counting Fractions, Decimals and Percentages			To count in fractions up to 10, starting from any number and using the $\frac{1}{2}$ and $\frac{2}{4}$ equivalence on the number line.	To 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 ten.	To count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.	To extend counting from year 4, using decimals and fractions including bridging zero, for example on a number line. To continue to practise counting forwards and backwards in simple fractions.	

<p>Recognising, Finding and Naming Fractions</p>		<p>To recognise, find and name a half as one of two equal parts of an object, shape or quantity by solving problems.</p> <p>To recognise, find and name a quarter as one of four equal parts of an object, shape or quantity by solving problems.</p> <p>To connect halves and quarters to the equal sharing and grouping of sets of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole</p>	<p>To recognise, find, name, identify and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ of a length, number, shape, set of objects or quantity and know that all parts must be equal parts of the whole.</p> <p>To connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet $\frac{3}{4}$ as the first example of a non-unit fraction.</p>	<p>To understand the relation between unit fractions as operators (fractions of), and division by integers.</p> <p>To recognise, understand and use fractions as numbers: unit fractions and non-unit fractions with small denominators as numbers on the number line (going beyond 0 -1 and relating this to measure), and deduce relations between them, such as size and equivalence.</p> <p>To recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.</p>	<p>To make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities.</p> <p>To know that decimals and fractions are different ways of expressing numbers and proportions.</p> <p>To understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths.</p>	<p>To identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.</p>	
<p>Comparing and Ordering Fractions</p>					<p>To compare and order unit fractions, and fractions with the same denominators.</p>	<p>To compare and order fractions whose denominators are all multiples of the same number.</p>	<p>To compare and order fractions, including fractions > 1.</p>

Adding and Subtracting Fractions				To add and subtract fractions with the same denominator within one whole through a variety of increasingly complex problems to improve fluency.	To add and subtract fractions with the same denominator to become fluent through a variety of increasingly complex problems beyond one whole.	<p>To add and subtract fractions with the same denominator and denominators that are multiples of the same number to become fluent through a variety of increasingly complex problems.</p> <p>To recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number.</p>	To add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions starting with fractions where the denominator of one fraction is a multiple of the other and progress to varied and increasingly complex problems.
Multiplying and Dividing Fractions						<p>To continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities.</p> <p>To multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.</p>	<p>To multiply simple pairs of proper fractions, writing the answer in its simplest form using a variety of images to support their understanding of multiplication with fractions.</p> <p>To divide proper fractions by whole numbers.</p>

Equivalence			To write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence $\frac{2}{4}$ and $\frac{1}{2}$.	To recognise and show, using diagrams, equivalent fractions with small denominators.	<p>To use factors and multiples to recognise equivalent fractions and simplify where appropriate.</p> <p>To recognise and show, using diagrams, families of common equivalent fractions.</p> <p>To recognise and write decimal equivalents of any number of tenths or hundredths.</p> <p>To recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$.</p>	<p>To read and write decimal numbers as fractions.</p> <p>To recognise and use thousandths and relate them to tenths, hundredths, decimal equivalents and measures.</p> <p>To recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.</p>	To recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. To use common factors to simplify fractions; use common multiples to express fractions in the same denomination.
-------------	--	--	---	--	--	--	--

Comparing and Ordering Decimals					<p>To learn decimal notation and the language associated with it, including in the context of measurements.</p> <p>To represent numbers with one or two decimal places in several ways, such as on number lines.</p> <p>To compare numbers, amounts and quantities with the same number of decimal places up to two decimal places.</p>	<p>To read, say, write, order and compare numbers with up to three decimal places.</p>	<p>To identify the value of each digit in numbers given to three decimal places.</p>
Rounding Decimals					<p>To round decimals with one decimal place to the nearest whole number.</p>	<p>To round decimals with two decimal places to the nearest whole number and to one decimal place.</p>	<p>To round decimals with three decimal places to the nearest whole number and to one decimal place.</p>

<p>Multiplying and Dividing Decimals</p>					<p>To 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.</p>		<p>To multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.</p> <p>To associate a fraction with division and calculate decimal fraction equivalents for a simple fraction.</p> <p>To multiply one-digit numbers with up to two decimal places by whole numbers in practical contexts, such as measures and money.</p> <p>To multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers in practical contexts involving measures and money.</p> <p>To use written division methods in cases where the</p>
--	--	--	--	--	--	--	---

							<p>answer has up to two decimal places.</p> <p>To recognise division calculations as the inverse of multiplication.</p>
Solve Problems Fractions, Decimals and Percentages					<p>To 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.</p> <p>To solve simple measure and money problems involving fractions and decimals to two decimal places.</p>	<p>To solve problems involving numbers up to three decimal places.</p> <p>To make connections between percentages, fractions and decimals and relate this to finding 'fractions of' to solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.</p>	<p>To solve problems which require answers to be rounded to specified degrees of accuracy and checking the reasonableness of their answers.</p>

Ratio and Proportion							<p>To recognise proportionality in contexts when the relations between quantities are in the same ratio, e.g. recipes.</p>
							<p>To solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</p>
							<p>To solve problems involving the calculation of percentages and the use of percentages for comparison including linking percentages or 360° to calculating angles of pie chart.</p>
							<p>To solve problems involving similar shapes where the scale factor is known or can be found.</p>
							<p>To solve problems</p>

							involving unequal quantities, sharing and grouping using knowledge of fractions and multiples.
Algebra - Equations		<p>To solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$</p> <p>To represent and use number bonds and related subtraction facts within 20</p>	<p>To recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems.</p> <p>To recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.</p>	<p>To solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</p> <p>To solve problems, including missing number problems, involving multiplication and division, including integer scaling.</p>		<p>To use the properties of rectangles to deduce related facts and find missing lengths and angles.</p>	<p>To express missing number problems algebraically.</p> <p>To find pairs of numbers that satisfy number sentences involving two unknowns.</p> <p>To enumerate all possibilities of combinations of two variables.</p>
Algebra- Formulae					<p>To recognise that perimeter can be expressed algebraically as $2(a + b)$ where a and b are the dimensions in the same unit.</p>		<p>To use simple formulae.</p> <p>To recognise when it is possible to use formulae for area and volume of shapes.</p>

Algebra - Sequences		To sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening.	To compare and sequence intervals of time. To order and arrange combinations of mathematical objects in patterns.				To generate and describe linear number sequences.
---------------------	--	--	--	--	--	--	---

<p>Measurement - Describe, Measure, Compare and Solve (All Strands)</p>	<p>To order two or three items by length or height. To order two items by weight or capacity.</p> <p>To use everyday languages to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and solve problems.</p>	<p>To compare, describe and solve practical problems for: lengths and heights, mass/weight, capacity and volume, time.</p> <p>To measure and begin to record the following: lengths and heights, mass/weight, capacity and volume, time.</p> <p>To move from using and comparing different types of quantities and measures using non-standard units, including discrete (for example, counting) and continuous (for example, liquid) measurement, to using manageable common standard units using measuring tools, such as a ruler, weighing scales and containers.</p>	<p>To choose and use appropriate standard units with increasing accuracy using their knowledge of the number system 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.</p> <p>To use the appropriate language and record using standard abbreviations.</p> <p>To compare and order lengths, mass, volume/capacity and record the results using >, < and =.</p> <p>To compare measures including</p>	<p>To measure using the appropriate tools and units, compare (including simple scaling by integers) add and subtract using mixed units: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).</p>	<p>To estimate, compare and calculate different measures, including money in pounds and pence.</p>	<p>To use all four operations to solve problems involving measure using decimal notation, including scaling and conversions.</p>	<p>To use a number line, to add and subtract positive and negative integers for measures such as temperature.</p> <p>To solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.</p>
---	---	--	--	---	--	--	---

			simple multiples such as 'half as high'; 'twice as wide'.				
Converting Units of Measure					<p>To use multiplication to convert from larger to smaller units.</p> <p>To convert between different units of measure and build on their understanding of place value and decimal notation to record metric measures, including money.</p>	<p>To use the knowledge of place value and multiplication and division to convert between standard units.</p> <p>To convert between different units of metric measure.</p> <p>To understand and use approximate equivalences between metric units and common imperial units.</p>	<p>To 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.</p> <p>To convert between miles and kilometres.</p> <p>To know approximate conversions to tell if an answer is sensible.</p>

Telling the Time

To use everyday language related to time.

To order and sequence familiar events.

To measure short periods of time in simple ways.

To sequence events in chronological order using language.

To recognise and use language relating to dates, including days of the week, weeks, months and years.

To tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

To read, tell and write the time to five minutes, including quarter past/to the hour/half hour and draw the hands on a clock face to show these times.

To become fluent in telling the time on analogue clocks and recording it.

To know the number of minutes in an hour and the number of hours in a day.

To compare and sequence intervals of time.

To tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks.

To begin to use digital 12-hour clocks and record their times in preparation for using digital 24-hour clocks in year 4.

To estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours.

To use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight.

To know the number of seconds in a minute and the number of days in each month, year

To read, write and convert time between analogue and digital 12- and 24-hour clocks.

To solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

To solve problems involving converting between units of time.

				and leap year. To compare durations of events.			
Money	To begin to use everyday language related to money.	To recognise and know the value of different denominations of coins and notes.	<p>To become fluent in counting and recognising coins.</p> <p>To recognise and use symbols for pounds (£) and pence (p) accurately, recording pounds and pence separately; combine amounts to make a particular value.</p> <p>To find and use different combinations of coins that equal the same amounts of money.</p> <p>To solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.</p>	<p>To become fluent in recognising the value of coins.</p> <p>To add and subtract manageable amounts of money, including mixed units, to give change, using both £ and p in practical contexts.</p>			

Perimeter, Area and Volume				<p>To measure the perimeter of simple 2D shapes.</p>	<p>To measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres.</p> <p>To know perimeter can be expressed algebraically as $2(a + b)$ where a and b are the dimensions in the same unit.</p> <p>To find the area of rectilinear shapes by counting squares.</p> <p>To relate area to arrays and multiplication.</p>	<p>To measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres including using the relations of perimeter. Note: Missing measures questions can be expressed algebraically.</p> <p>To calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2), use the area of rectangles to find unknown lengths and estimate the area of irregular shapes. Note: Missing measures questions can be expressed algebraically.</p> <p>To calculate the area from scale drawings using given measurements.</p>	<p>To recognise that shapes with the same areas can have different perimeters and vice versa.</p> <p>To recognise when it is possible to use formulae for area and volume of shapes.</p> <p>To relate the area of rectangles to parallelograms and triangles and calculate their areas, understanding and using the formulae (in words or symbols) to do this.</p> <p>To calculate the area of parallelograms and triangles.</p> <p>To calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and</p>
----------------------------	--	--	--	--	---	---	---

						To estimate volume.	extending to other units (for example, mm ³ and km ³).
--	--	--	--	--	--	---------------------	---

<p>Properties of Shapes - Recognise 2D and 3D Shapes and Their Properties</p>	<p>To show an interest in shape and space by playing with shapes or making arrangements with objects.</p> <p>To show interest in shape by sustained construction activity or by talking about shapes or arrangements. To begin to talk about shapes in everyday objects, e.g. 'round' and 'tall'.</p> <p>To begin to use mathematical names for 'solid' 3D shapes and 'flat' 2D shapes, and mathematical terms to describe</p>	<p>To recognise, handle and name common 2D and 3D shapes in different orientations/sizes and relate everyday objects fluently.</p> <p>To recognise that rectangles, triangles, cuboids and pyramids are not always similar to each other.</p>	<p>Pupils read and write names for shapes that are appropriate for their word reading and spelling.</p> <p>To handle, identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line.</p> <p>To handle, identify and describe the properties of 3D shapes, including the number of edges, vertices and faces.</p> <p>To identify 2D shapes on the surface of 3D shapes.</p>	<p>To describe the properties of 2D and 3D shapes using accurate language.</p> <p>To extend knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygon and polyhedron.</p> <p>To recognise 3D shapes in different orientations and describe them.</p>	<p>To identify lines of symmetry in 2D shapes presented in different orientations.</p> <p>To recognise line symmetry in a variety of diagrams, including where the line of symmetry does not dissect the original shape.</p>	<p>To identify 3D shapes, including cubes and other cuboids, from 2D representations.</p>	<p>To illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.</p> <p>To express algebraically the relationship between angles and lengths.</p>
---	--	---	--	---	--	---	---

	<p>shapes.</p> <p>To select a particular named shapes.</p> <p>To explore characteristics of everyday objects and shapes and use mathematical language to describe them.</p>						
Compare and Classify Shapes	To show awareness of similarities of shapes in the environment.		To identify, compare and sort common 2D and 3D shapes and everyday objects on the basis of their properties and use vocabulary precisely.		<p>To compare lengths and angles to decide if a polygon is regular or irregular.</p> <p>To compare and classify geometric shapes, including different quadrilaterals and triangles, based on their properties and sizes.</p>	To distinguish between regular and irregular polygons based on reasoning about equal sides and angles.	To compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons using known measurements.

<p>Drawing 2D Shapes and Constructing 3D Shapes</p>			<p>Pupils draw lines and shapes using a straight edge.</p>	<p>To connect decimals and rounding to drawing and measuring straight lines in centimetres, in a variety of contexts.</p> <p>To identify horizontal and vertical lines and pairs of perpendicular and parallel lines.</p> <p>To draw 2D shapes and make 3D shapes using modelling materials.</p>	<p>To draw with increasing accuracy and develop mathematical reasoning to analyse shapes and their properties and confidently describe the relationships between them.</p> <p>To complete a simple symmetric figure with respect to a specific line of symmetry.</p>	<p>To become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor.</p> <p>To use conventional markings for parallel lines and right angles.</p>	<p>To draw 2D shapes and nets accurately using given dimensions and angles using measuring tools, conventional markings and labels for lines and angles.</p> <p>To recognise, describe and build simple 3D shapes, including making nets.</p>
---	--	--	--	--	--	--	---

Angles				<p>To recognise angles as a property of shape or a description of a turn.</p> <p>To identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn.</p> <p>To identify whether angles are greater than or less than a right angle</p>	<p>To identify acute and obtuse angles and compare and order angles up to two right angles by size in preparation for using a protractor.</p>	<p>To know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles. To draw given angles, and measure them in degrees.</p> <p>To identify: angles at a point and one whole turn (total 360°), angles at a point on a straight line and $1/2$ a turn (total 180°) and other multiples of 90°.</p> <p>To use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides.</p> <p>To use the properties of rectangles to deduce related facts and find missing lengths and angles by using angle sum facts and other properties to make deductions about</p>	<p>To recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.</p>
--------	--	--	--	--	---	--	---

						missing angles and relate these to missing number problems.	
Position, Direction and Movement	<p>To use positional language. To describe their relative position such as 'behind' or 'next to'.</p>	<p>To describe position, direction and movement, including whole, half, quarter and three-quarter turns in both directions and connect clockwise with the movement on a clock face.</p> <p>To use the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside.</p>	<p>To 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 anticlockwise).</p>		<p>To describe positions on a 2D grid as coordinates in the first quadrant.</p> <p>To draw a pair of axes in one quadrant, with equal scales and integer labels.</p> <p>To read, write and use pairs of coordinates, including using coordinate plotting ICT tools.</p> <p>To plot specified points and draw sides to complete a given polygon.</p> <p>To describe movements between positions as translations of a given unit to the left/right and up/down.</p>	<p>To identify, describe and represent the position of a shape following a reflection (in lines that are parallel to the axes) or translation, using the appropriate language, and know that the shape has not changed</p>	<p>To draw and label a pair of axes in all four quadrants with equal scaling. To describe positions on the full coordinate grid (all four quadrants).</p> <p>To draw and label simple shapes – rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes.</p> <p>To translate simple shapes where coordinates may be expressed algebraically on the coordinate plane and reflect them in the axes.</p>

Patterns	<p>To use familiar objects and common shapes to create and recreate patterns and build models.</p> <p>To recognise, create and describe patterns.</p>		<p>To order and arrange combinations of mathematical objects and shapes, including those in different orientations, in patterns and sequences.</p>				
----------	---	--	--	--	--	--	--

<p>Statistics - Record, Present and Interpret Data</p>	<p>To record, using marks that they can interpret and explain.</p>		<p>To record, interpret, collate, organise and compare information.</p> <p>To interpret and construct simple pictograms, tally charts, block diagrams and simple tables (e.g. many-to-one correspondence in pictograms with simple ratios 2, 5, 10 scales).</p> <p>To ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity.</p> <p>To ask and answer questions about totalling and comparing categorical data.</p>	<p>To interpret and present data using bar charts, pictograms and tables and use simple scales with increasing accuracy.</p>	<p>To understand and use a greater range of scales in data representations.</p> <p>To interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.</p>	<p>To begin to decide which representations of data are most appropriate and why.</p> <p>To connect coordinates and scales to the interpretation of time graphs.</p> <p>To complete, read and interpret information in tables, including timetables.</p>	<p>To connect conversion from kilometres to miles in measurement to its graphical representation.</p> <p>To connect work on angles, fractions and percentages to the interpretation of pie charts.</p> <p>To interpret and construct pie charts and line graphs (relating to two variables) and use these to solve problems.</p>
--	--	--	---	--	---	--	--

Solve Problems				To solve one-step and two-step questions using information presented in scaled bar charts and pictograms and tables.	To solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	To solve comparison, sum and difference problems using information presented in a line graph.	To know when it is appropriate to find the mean of a data set. To calculate and interpret the mean as an average.
----------------	--	--	--	--	--	---	--