

Avonwood Primary School

Maths Curriculum Policy



November 2024

Subject Leader: Mr Allen



Avonwood Primary School

The best in everyone™

Part of United Learning

Contents

1.0 Our School Vision	4
1.1 How our whole school vision links with Maths.....	5
2.0 Subject Intent, Implementation & Impact	6
2.1 Subject Intent.....	6
2.2 Subject Implementation.....	7
2.3 Subject Impact	7
3.0 Sequencing of the Avonwood Maths Curriculum	8
3.1 Whole School Overview: Long Term Planning	8
3.3 Knowledge & Skills Overview – KS1	12
Year 1	12
Year 2	14
3.4 Knowledge & Skills Overview – KS2	18
Year 3	19
Year 4	22
Year 5	27
Year 6	33
4.0 Maths Curriculum Resources	39
4.1 Example Medium Term Plan.....	39
4.2 Lesson Structure.....	41
4.3 Example Knowledge Organiser	42
5.0 Greater Depth	43
5.1 What is Greater Depth?	43
5.2 Greater Depth at Avonwood.....	44
5.3 Greater Depth Assessment	45
5.4 Greater Depth Concerns	46
6.0 Assessment	47
6.1 Summative assessment.....	47
6.2 Formative assessment.	48
7.0 Roles and Responsibilities	49
7.1 Class Teacher.....	49
7.2 Subject Leader.....	49

7.3 Senior Leadership Team..... 50

1.0 Our School Vision

At Avonwood, we see it as our moral imperative for all children, regardless of background, to achieve their very best. Our children all read classic literature, study modern foreign languages, experience the science of dissecting organs and even learn a new musical instrument every year as a right, not a privilege. These high expectations enable us to develop and deliver a curriculum rich in carefully sequenced and embedded powerful knowledge. We expect teachers to deliver lessons with that fulfil this expectation whilst living up to our ambition of **inspiring wonder and intellectual curiosity**.

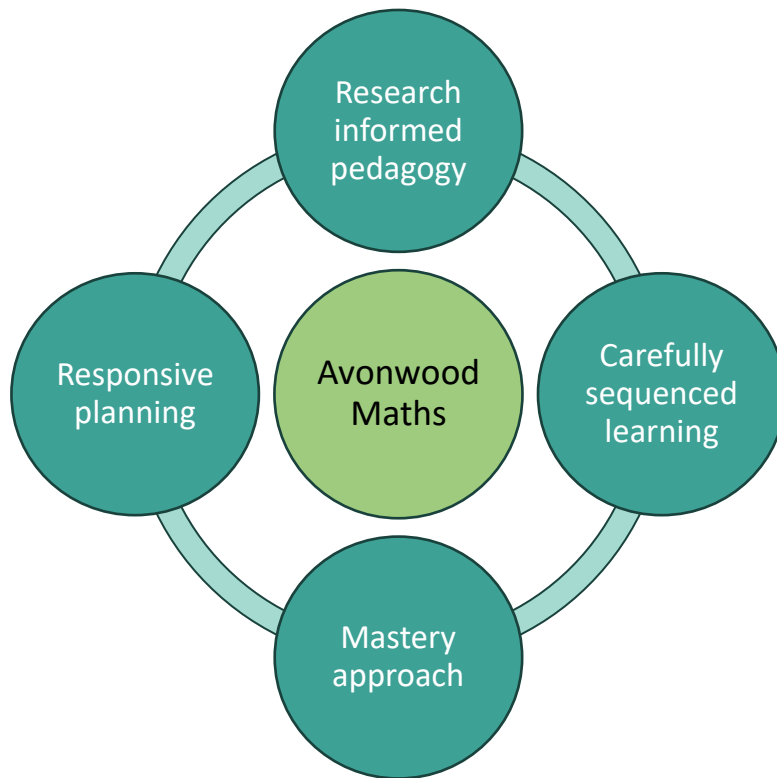
Our curriculum is at the centre of every education decision we take at Avonwood. We do not see the curriculum as a finished product, far from it. On a weekly, termly and annual basis, we review plans, consider our intent and make sure we deliver the very best academic and enrichment diet to our children. All curriculum areas have a subject lead that is responsible for the design, implementation and ongoing monitoring and evaluation of this area.

Avonwood has moved away from tokenistic topics towards knowledge rich experiences in discrete subjects, with deliberate cross curricular links only when appropriate. For example, in Year 2, we teach the Great Fire of London when children have already learnt in Geography where London is and its status within the United Kingdom. The awe and wonder of learning continues to characterise the Avonwood curriculum but in a purposeful, sequenced and deliberate manner.

If 'powerful knowledge' is the head of our school, then reading for pleasure and progress is its heart. Our school environment and curriculum crystallises reading for pleasure as a valued and purposeful part of our curriculum. We agree with the view of Thompson (2020) when she states the importance of becoming a reader who teachers and a teacher who reads is a pedagogy with far reaching consequences. Reading progression is carefully mapped to provide opportunities for exposure to a wide variety of genres, authors of different backgrounds and a mixture of classic and contemporary texts. Every afternoon, we 'Drop Everything and Read' to end our school day with a high quality whole class reading session. **We wholeheartedly believe reading is the golden key to unlocking the potential of every child's success.**

We are honoured to be the only United Nations Earth Charter Primary School in Europe. We believe it is vital that all children have an understanding of their responsibility as global citizens and our eight Earth Charter principals are referenced throughout our curriculum and daily life. From the importance of peace and respect for all living creatures through to the consideration of the past and future of our planet, this ethos gives our Avonwood curriculum a very current and relevant perspective that all stakeholders within our community hold strong. This runs deep within our "Avonwood DNA" and is optimised by our school mantra... it starts with one!

1.1 How our whole school vision links with Maths



At Avonwood, the mathematics curriculum ensures that all children thrive and develop a rich and connected understanding of core concepts regardless of their background or prior mathematical experiences. Through the key principles outlined above, we ensure that children will master what is being taught and be able to apply the maths to a range of situations and contexts.

We ensure that all children fulfil the learning goal through our key principles: the teachers present themselves as ‘the expert’ in the classroom, delivering the content through a scaffolded approach in alignment with current educational research; the lessons taught are carefully sequenced, taking into account The White Rose progression, the National curriculum and teacher assessment; this sequencing is also encompassed by our goal of ‘responsive planning’, where gaps are identified, we aim to fill these as quickly as possible to ensure that no child be left behind; finally, we have adopted a mastery approach which allows children to develop a conceptual and connected understanding of core concepts through the use of manipulatives, the careful selection of examples and the precise use of mathematical vocabulary.

Maths is more than factual recall and following steps, it is about understanding how and why things work. It is also about being able to *use* the knowledge learnt in the classroom and applying it to the real world. This can often be seen in our ‘Golden Acorn’ challenges, which challenge each child at the end of the lesson to apply their learning in a new context. These challenge the boundaries of children’s understanding and expands their schemata, drawing connections to both previous learning and life experiences, developing our aim of conceptual understanding. We create positive experiences that provide firm foundations for KS3, KS4 and beyond by providing them with key skills and strategies to problem solve, such as bar models, which allow children to support their reasoning. Our vision is to develop analytical thinkers whilst keeping alive the love of learning.

Maths at Avonwood is a purposeful, engaging, and enriching experience which challenges all pupils to flourish into the best mathematician that they can be.

2.0 Subject Intent, Implementation & Impact

2.1 Subject Intent

Teaching for Mastery

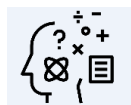
Our aim is to equip all pupils with the skills and confidence to solve a range of mathematical problems through fluency with numbers and mathematical reasoning. We strive to help pupils make connections between mathematical concepts and demonstrate their understanding in a variety of ways.



Attitude: We aim for pupils at Avonwood Primary school to display a positive approach to maths and to embrace a challenge whilst seeing mistakes as part of the learning process.



Wider curriculum: The pupils are encouraged to look for and apply mathematics in all aspects of the wider curriculum, developing essential life skills and an enjoyment and curiosity about the subject.



Building knowledge: We aim to build knowledge and skills by regularly revisiting key concepts, providing the pupils with the opportunity to rehearse them through practice consolidating and deepening their understanding.

We believe that children should be active participants throughout the whole maths lesson. We want pupils to feel confident to share their ideas and thinking and to have a go even when they are unsure. The children are encouraged to question one another and build on each other's ideas through their explanations.

We aim for all pupils to:

- Become fluent in the fundamentals of mathematics so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- Be able to solve problems by identifying, understanding and applying relevant mathematical principles to a variety of problems, including in unfamiliar and real-life contexts. We ensure problem solving takes place in every lesson in some form.
- Reason mathematically by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.

2.2 Subject Implementation

What does maths look like at Avonwood?

Pedagogy at Avonwood Primary school focuses on breaking down learning into small steps to make sure the pupils are active throughout the lesson. We follow the White Rose maths planning to ensure our children have the full coverage and this is supported by clear skills and knowledge progression. This ensures that skills and knowledge are built on year by year and sequenced appropriately to maximise learning for all children. Challenge focuses on depth and breadth of understanding and we expect the children to be able to apply their knowledge in a range of challenging scenarios.

Teachers use questioning throughout the maths lesson to elicit understanding and to further challenge the children to think deeper. The questions used are precise and develop mathematical thinking. Through these questions, teachers check for understanding as well as unpicking any misconceptions. AfL will be carried out in a number of ways, such as using cold calling and mini whiteboards, employing cyclical guided practice and circulating during independent work.

Teachers will use precise mathematical language, ensuring that new vocabulary is explicitly taught especially where terms may have a dual meaning. When pupils are answering questions and explaining their reasoning, teachers will support them to use precise mathematical language.

Where children are working significantly below their expected age-related requirements, scaffolding and targeted work will be provided daily. This work will have been planned by the teacher and will be in line with their PLP targets which have been agreed by both the SENDco and parents.

6 Phase lesson design across the school (EYFS to Year 6):



1. Monthly review task
2. Daily review task
3. I: Teacher Modelling & Explaining
4. We: Guided Practice
5. You: Independent Task
6. Discussion-based Plenary

Manipulatives and representations.



At Avonwood, we use the number line as the core representation to help to underpin the effective acquisition of both conceptual understanding and procedural fluency. In Early years, it is used alongside Numicon and ten frames to build 1:1 correspondence. In Year 1, they begin by using a number track progressing onto a number line to support with counting and ordering numbers. In Year 2, the number line is used to support the children's development of additive reasoning and procedures. Throughout Key stage 2, the number line underpins the work across a variety of domains, including ordinality (estimation), rational numbers (fractions) and multiplicative reasoning.

2.3 Subject Impact

Secure and successful learning is assessed through talking to the children about their understanding of maths. At Avonwood, test outcomes in mathematics provide a key measure of success for our curriculum content and our delivery.

Children are equipped with understanding, knowledge, skills, enthusiasm and confidence.

3.0 Sequencing of the Avonwood Maths Curriculum

3.1 Whole School Overview: Long Term Planning

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
6	Place value Addition & subtraction Multiplication & division Decimals	Fractions percentages	Decimals Percentages Algebra Measure – perimeter & area	Measure Geometry Co-ordinates shape	Statistics Consolidation	Investigation & problem solving
5	Place value Addition & subtraction	Multiplication & division A Fractions A	Multiplication & division B Fractions B	Decimals and percentages Perimeter and area Statistics	Shape Position & direction Decimals	Negative numbers Converting units volume
4	Place value Addition & subtraction	Area Multiplication & division	Multiplication & division Length and perimeter Fractions	Fractions Decimals	Decimals Money Time	Shape Statistics Position & direction
3	Place value Addition & subtraction	Addition & subtraction Multiplication & division	Multiplication & division Length & perimeter	Fractions Mass and capacity	Fractions Money Time	Shape Statistics
2	Place value Addition & subtraction	Addition & subtraction Shape	Money Multiplication & division	Length and height Mass, capacity and temperature	Fractions Time	Statistics Position & direction
1	Place value (within 10) Addition and subtraction (within 10)	Addition & subtraction (within 10) Shape	Place value (within 20) Addition & subtraction (within 20) Place value (within 50)	Length & height Mass & volume	Multiplication & division Fractions Position and direction	Place value (within 100) Money Time

3.2 Knowledge & Skills Overview – EYFS

Term & Focus	Early Learning Goal	Knowledge	Skills
<p>Autumn EYFS</p>	<p><u>Development Matters</u> Link the number symbol (numeral) with its cardinal number value</p> <p>Understand the ‘one more than/one less than’ relationship between consecutive numbers.</p> <p>Continue, copy and create repeating patterns.</p> <p><u>Number</u> Have a deep understanding of numbers to 5, including the composition of each number;</p> <p>Subitise (recognise quantities without counting) up to 5; -</p> <p><u>Numerical Pattern</u> Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;</p>	<ul style="list-style-type: none"> • I know that a group of objects can be sorted according to different criteria (size, colour, shape etc) • I know that numbers have different values • I know the meaning of the words <i>more</i> and <i>fewer</i> • I know that if one more is added to a set, then the total number increases • I know that if one object is removed from the set then the total number becomes less • I know the order of numbers from 1 to 5 and 5 to 1 • I know how to count objects (up to 5) accurately • I know that I can use different words to explain the passing of time • I know how to describe a simple pattern • I know the names of common 2-D shapes 	<ul style="list-style-type: none"> • I can explain simple similarities and differences between objects • I can sort objects according to given criteria and my own criteria • I can count a group of objects accurately (when the objects are not the same) • I can explain which group has <i>more</i>, and which group has <i>fewer</i> objects • I can recognise numerals from 0 to 5 • I can represent those numbers with objects • I can recognise different representations of a given numeral (subitise) • I can count objects by lining them up, pointing to or touching them • I can explain how time passes using words such as <i>before, after, now, yesterday, today, tomorrow</i> • I can copy a simple pattern using concrete resources • I can name and describe common shapes using <i>corners, sides, straight, curved, flat, solid</i>

<p>Spring EYFS</p>	<p><u>Development Matters</u> Link the number symbol (numeral) with its cardinal number value</p> <p>Understand the ‘one more than/one less than’ relationship between consecutive numbers.</p> <p>Compare length, weight and capacity</p> <p><u>Number</u> Have a deep understanding of numbers to 10, including the composition of each number;</p> <p>Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.</p> <p><u>Numerical Pattern</u> Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;</p>	<ul style="list-style-type: none"> • I know the order of numbers from 1 to 10 and 10 to 1 • I know how to count up to 10 objects accurately • I know that numbers can be made by combining two amounts, including zero • I know that the same total number can be made up of different number bonds • I know how to record and explain my learning and explain it to someone else • I know why it is important to check my answers • I know that some objects feel heavy and some feel light • I know that containers can hold different materials such as water, sand and beads • I know that objects can be different lengths and heights • I know the names of common 3-D shapes 	<ul style="list-style-type: none"> • I can count an irregular arrangement of objects (up to 10) by lining objects up or pointing to them • I can find the total of two numbers by combining the groups • I can use concrete resources/pictorial representations to solve addition and subtraction problems within 5, then 10 • I can find different pairs of numbers to make a given total • I can place objects on a ten frame to show how they are partitioned in to 5 and some more • I can tell someone else about my understanding using concrete resources and pictures or marks • I can check my answers with support using classroom resources such as Numicon and ten frames. • I can compare the weight of two objects by holding one in each hand • I can describe the amount in a container using <i>full, empty, half full</i> • I can describe the length or height of an object using <i>long, short, tall, longer, shorter, taller</i> • I can name and describe common shapes using <i>corners, sides, straight, curved, flat, solid</i>
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<p>Summer EYFS</p>	<p><u>Numerical Pattern</u> Verbally count beyond 20, recognising the pattern of the counting system;</p> <p>Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.</p>	<ul style="list-style-type: none"> • I know the order of numbers up to 20 • I know how to compare two numbers within 20 • I know the composition of teen numbers • I know what an odd and even number is • I know how to count on to add • I know how to count back to subtract • I know how to recognise equal groups • I know how to share objects equally • I know that doubling is the opposite of halving • I know that objects can be placed in different positions 	<ul style="list-style-type: none"> • I can count correctly to and from 20 • I can recognise and order numbers to 20 • I can use a number line to solve addition and subtraction problems within 10 • I can identify which groups are equal and which are not equal • I can share an amount equally between 2 groups to find half • I can double a number by adding the same amount again • I can describe the position of an object using <i>above, below, in the middle, next to, behind</i>
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3.3 Knowledge & Skills Overview – KS1

Year 1

Term & Focus	National Curriculum Objectives	Knowledge	Skills
Autumn Year 1	<ul style="list-style-type: none"> Count to and across 100, forwards and backwards, beginning with 1 or 0. Count, read and write numbers to 100 in numerals Identify 1 more or 1 less Read and write numbers from 1 to 20 in numerals and words Read, write and interpret mathematical statements involving addition, subtraction and equals signs Recognise and name common 2-D and 3-D shapes including rectangles, squares, circles, triangles, cuboids, cubes, pyramids and spheres 	<ul style="list-style-type: none"> I know how to identify place value within 10 and then 20 I know how to write numbers 20 as words and numerals I know how to combine numbers or count on in order to add within 10 I know how to remove a part of a whole number or count back to subtract within 10 I know that symbols can be used to represent addition and subtraction sentences (+, -, =) I know the meaning of each symbol and its place within a number sentence I know that 2-D shapes are flat, and 3-D shapes are solid I know that shapes have straight or curved sides, edges, faces and corners (vertices) 	<ul style="list-style-type: none"> I can order numbers within 10, using the terms <i>greater than</i>, <i>less than</i>, <i>more</i> and <i>less</i>. I can read and write numerals and words to represent numbers to 20 I can identify tens and ones in any given number to 20 I can solve addition problems using concrete resources, number lines and recall of number bonds within 10. I can use symbols to represent addition and subtraction in number sentences I can sort 2-D and 3-D shapes according to their properties I can describe 2-D and 3-D shapes using the correct mathematical vocabulary I can identify regular and irregular shapes using mathematical criteria
Spring Year 1	<ul style="list-style-type: none"> Count to and across 100, forwards and backwards, beginning with 1 or 0. 	<ul style="list-style-type: none"> I know how to combine numbers or count on in order to add within 20 I know how to remove a part of a whole number or count back to subtract within 20 	<ul style="list-style-type: none"> I can solve addition problems using concrete resources, number lines and recall of number bonds within 20. I can read and write numerals to represent numbers to 50

	<ul style="list-style-type: none"> Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s Identify 1 more or 1 less Read, write and interpret mathematical statements involving addition, subtraction and equals signs Practise counting as reciting numbers and counting as enumerating objects: counting in 2s, 5s and 10s from different multiples to develop recognition of patterns in the number system (eg odds and evens) Compare, describe and solve practical problems for: length, height, mass and weight 	<ul style="list-style-type: none"> I know how to count correctly from 0 to 50 and back again I know how to identify place value within 50 I know that symbols can be used to represent addition and subtraction sentences (+, -, =) I know how to count in multiples of 2s, 5s and 10s in order to continue a number sequence I know how to identify odd and even numbers I know how to compare and describe the length, height, weight and mass of everyday objects using correct vocabulary (<i>tall, long, short, heavy, light, longer than, shorter than</i>) 	<ul style="list-style-type: none"> I can identify tens and ones in any given number to 50 I can order and compare numbers within 50, using the terms <i>greater than, less than, more and less</i>. I can recite number patterns counting in 2s, 5s and 10s I can use concrete resources and pictorial representation to find the missing/next number in the patterns I can make comparisons when measuring objects visually and order objects (eg tallest to shortest) I can describe and compare measurement using non-standard measures (hands, lolly sticks, paper clips) I can use balance scales to compare the weight/mass of two given objects
Summer Year 1	<ul style="list-style-type: none"> Solve one-step problems involving multiplication and division by calculating the answer using concrete objects, pictorial representations and arrays Recognise, find and name a half as 1 of 2 equal parts of an object, shape or quantity Recognise, find and name a quarter as 1 of 4 equal parts of an object, shape or quantity 	<ul style="list-style-type: none"> I know how to identify equal and unequal groups I know that multiplication is repeated addition I know that division is repeated subtraction I know how to represent my understanding with concrete resources and pictures I know that two halves make a whole I know that halves are equal parts 	<ul style="list-style-type: none"> I can explain why groups are equal or unequal I can represent multiplication as a repeated addition sentence I can represent division as a repeated subtraction sentence I can explain my understanding of multiplication and division in simple problem solving activities I can identify that halving is the opposite to doubling I can find half and quarter of a given shape or quantity

	<ul style="list-style-type: none"> • Describe position and movement including whole, half, quarter and three-quarter turns • Count to and across 100, forwards and backwards, beginning with 1 or 0. • Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s • Compare and describe time (quicker, slower, earlier, later, hours, minutes, seconds, o'clock, half past) • Recognise and know the value of different denominations of coins and notes 	<ul style="list-style-type: none"> • I know that four quarters equal a whole • I know that quarters are equal parts • I know how to describe position and movement using specific vocabulary • I know how to identify whole, half, quarter and three-quarter turns • I know how to count correctly from 0 to 100 and back again • I know how to identify place value within 100 • I know that time can be compared and measured different ways • I know that certain activities will be measured in specific units of time • I know that coins and notes have different values 	<ul style="list-style-type: none"> • I can use the vocabulary share, equal, whole, half, quarter when explaining my learning • I can explain the position or movement of an object (eg <i>on top, in the middle, left, right, up, down, near, far, forwards, backwards</i>) • I can move correctly in response to instructions • I can read and write numerals to represent numbers to 100 • I can identify tens and ones in any given number to 100 • I can order and compare numbers within 100, using the terms <i>greater than, less than, more and less</i>. • I can select the correct vocabulary or unit of measurement to describe the length of an activity or event (eg day, week, minute, hour) • I can measure and record the length of given activities using sand timers • I can sort and order coins and notes according to their value • I can add coins to find the total value
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Year 2

Term & Focus	National Curriculum Objectives	Knowledge	Skills
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<p>Autumn Year 2</p>	<ul style="list-style-type: none"> • Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward and backward • Recognise the place value of each digit in a two-digit number (tens, ones) • Identify, represent and estimate numbers using different representations, including the number line • Compare and order numbers from 0-100; use <, > and = signs • Read and write numbers to at least 100 in numerals and in words • Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • Add and subtract numbers using concrete objects, pictorial representations and mentally • Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems • Recognise and use symbols for pounds and pence; combine amounts to make a particular value 	<ul style="list-style-type: none"> • I know how to count in steps of 2 and 5 from memory • I know how to identify number patterns to help me count forward and backward in given steps of 3, and steps of 10 (from any number) • I know that two digit numbers are made up of tens and ones • I know that the value of the digits in a two-digit number determines its place on a number line • I know that symbols can be used to compare numbers • I know how to add 2 two-digit multiples of 10 • I know that I can use a range of strategies to help me add one and two digit numbers • I know that addition calculations can be completed in any order, and that subtraction calculations cannot • I know that I can use fact families to solve missing number addition or subtraction equations • I know that coins are worth different values • I know that different symbols are used to represent the value of the coins • I know how to read these symbols 	<ul style="list-style-type: none"> • I can continue a number sequence by using concrete resources such as number lines and number squares • I can partition a two digit number into tens and ones using place value resources • I can correctly identify the value of a specified digit in a two-digit number • I can correctly use < and > to compare two-digit numbers • I can derive facts such as $3 + 7 = 10$ to calculate $30 + 70 = 100$ • I can select the most efficient method in order to solve a particular calculation • I can use the commutative law to check my answers • I can use my knowledge of addition and subtraction fact families to prove or disprove answers and explain my understanding • I can identify different coins and notes and explain their value • I can find different ways to make the same total value
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	<ul style="list-style-type: none"> Find different combinations of coins that equal the same amounts of money Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers 	<ul style="list-style-type: none"> I know how to add and subtract different coins and record the total amount I know that division is the inverse of multiplication I know how to identify odd and even numbers 	<ul style="list-style-type: none"> I can use symbols correctly to record the total value I can respond to the language of addition and subtraction within problems involving money I can use known rules to help me recall and check multiplication and division calculations (eg a multiple of 2 will always be an even number, multiples of 5 end either in 5 or 0)
Spring Year 2	<ul style="list-style-type: none"> Calculate mathematical statements for multiplication and division within the multiplication tables and write them using \times, \div and $=$ Show that multiplication can be done in any order (commutative) and division of one number by another cannot Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and facts Interpret and construct simple pictograms, tally charts, block diagrams and simple tables Ask and answer simple questions by counting and sorting categories, and totalling and comparing data Identify and describe the properties of 2-D and 3-D shapes, including number of sides, line symmetry, 	<ul style="list-style-type: none"> I know that different symbols can be used to represent multiplication and division I know that different vocabulary is used for multiplication and division (<i>share between, groups of, divided by, multiplied by</i>) I know how to use different strategies to solve multiplication and division problems I know that data can be represented in different formats I know how to read a simple scale I know that data can be organised into a range of categories I know the names of common 2-D and 3-D shapes I know what a line of symmetry is I know that shapes can be grouped according to their properties I know that 2-D and 3-D shapes can be seen in the world around us 	<ul style="list-style-type: none"> I can use \times and \div to record my own multiplication and division calculations I can respond appropriately to the language of multiplication and subtraction. I can represent my understanding of multiplication and division using concrete resources, drawing pictures and arrays and abstract equations I can explain the information represented in a pictogram, tally chart or block diagram I can read a scale represented in 2s, 5s or 10s I can retrieve information from a chart or table in order to answer simple questions I can identify specified 2-D and 3-D shapes in a collection of shapes I can find a line of symmetry in a given shape and explain why a given example might not have a line of symmetry I can use correct vocabulary to describe and sort shapes according to their properties (<i>edge, face, sides, vertices</i>)

	<p>number of edges, vertices and faces</p> <ul style="list-style-type: none"> Identify 2-D shapes on the surface of 3-D shapes Compare and sort common 2-D and 3-D shapes and everyday objects Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ of a length, shape, set of objects or quantity Write simple fractions ($1/2$ of $6 = 3$) and recognise the equivalence of $2/4$ and $\frac{1}{2}$ Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm) Compare and order lengths and record results using $<$, $>$ and $=$ 	<ul style="list-style-type: none"> I know that a whole can be divided into equal parts, and that each part is called a <i>fraction</i> I know the correct names for these fractions (<i>thirds, quarters, halves</i>) I know that two quarters is equivalent to one half I know how to use a ruler to find the length and height of an object I know how to compare numbers using the vocabulary <i>greater than, less than</i> and <i>equal to</i> 	<ul style="list-style-type: none"> I can identify halves, quarters, three quarters and thirds of shapes and quantities I can recognise and explain why an example does not show a particular fraction I can demonstrate that one half can be made up of two quarters using concrete resources I can read scales on a ruler to measure metres and centimetres I can record and compare measurements using the correct vocabulary and the symbols $<$, $>$ and $=$
Summer Year 2	<ul style="list-style-type: none"> Order and arrange combinations of mathematical objects in patterns and sequences Use mathematical vocabulary to describe position, direction and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three quarter turns (clockwise and anti-clockwise) Use place value and number facts to solve problems 	<ul style="list-style-type: none"> I know that patterns and sequences can be made from shapes, sizes, colours and different orientations I know that movement and position can be explained using specific vocabulary. I know how to recall known facts quickly in order to help me find new facts I know how to identify specific vocabulary in a maths problem to decide which operation is needed I know that time is measured in a variety of increments 	<ul style="list-style-type: none"> I can identify how patterns and sequences are made up I can continue a pattern or sequence and explain how I have completed it I can demonstrate the terms <i>clockwise, anti-clockwise, half turn, quarter turn, three quarter turn</i> and <i>right angles</i> in my actions and explanations. I can identify the tens and ones in a number to 100. I can spot patterns in number facts and apply my knowledge to new examples (eg if $65 + 15 = 80$, then $65 + 16 = 81$)

	<ul style="list-style-type: none"> • Use concrete objects and pictorial representations to solve addition and subtraction problems • Compare and sequence intervals of time • Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times • Know the number of minutes in an hour and the number of hours in a day • Choose and use appropriate standard units to estimate and measure mass/temperature/capacity • Compare and order volume/capacity/mass and record results using <.>, = 	<ul style="list-style-type: none"> • I know how to read quarter to and quarter past the hour • I know how to count in 5s • I know that there are 60 minutes in an hour • I know that there are 24 hours in a day • I know that mass is measured in <i>grams</i> and <i>kilograms</i> • I know that temperature is measured in <i>centigrade</i> • I know that capacity is measured in <i>millilitres</i> and <i>litres</i> • I know how to order the smallest to the largest measurement and vice versa 	<ul style="list-style-type: none"> • I can identify suitable measurements of time for any given activity – <i>seconds, hours, minutes, days, weeks, months, years</i> • I can read and write <i>quarter to</i> and <i>quarter past</i> times • I can draw times to indicate 5 minute increments (5 past, 10 past, 5 to, 25 past etc) . • I can weigh objects and record their mass using balance scales • I can read scales in order to record the temperature • I can find the capacity and volume of a variety of containers and record in ml and l • I can compare numbers in order to order objects according to their measurements
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3.4 Knowledge & Skills Overview – KS2

Year 3

Term & Focus	National Curriculum Objectives	Knowledge	Skills
Autumn Year 3	<ul style="list-style-type: none"> • Count from 0 in multiples of 4, 8, 50 and 100 • Find 10 or 100 more or less than a given number • Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • Compare and order numbers up to 1000 • Identify, represent and estimate numbers using different representations • Read and write numbers up to 1000 in numerals and in words • Solve number problems and practical problems • Add and subtract numbers mentally, including: <ul style="list-style-type: none"> • A three-digit number and ones • A three-digit number and tens • A three-digit number and hundreds • Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction • Estimate the answer to a calculation and use inverse operations to check answers 	<ul style="list-style-type: none"> • I know how to count in steps of 50 and 100 from memory • I know how to identify number patterns to help me count forward and backward in steps of 4 and 8 (from zero) • I know that three digit numbers are made up of hundreds, tens and ones • I know that the value of the digits in a three-digit number determines its place on a number line • I know that numbers can be represented in a variety of ways, using words, numerals, concrete resources and pictures • I know that problems can be solved in a variety of ways • I know that there are various methods to help me solve mental calculations, such as recall, partitioning, counting forwards and backwards, doubling and halving. • I know that numerals in a three-digit number need to be placed correctly in a grid • I know that it is possible to make reasoned estimations by rounding three-digit numbers 	<ul style="list-style-type: none"> • I can identify and apply patterns and rules in order to find the next number in the sequence, thinking about known facts such as doubles and halves to help me work out new multiplication facts • I can partition a three-digit number into hundreds, tens and ones using place value resources • I can correctly identify the value of a specified digit in a three-digit number • I can correctly use $<$ and $>$ to compare three-digit numbers • I can use mathematical equipment to represent three-digit numbers accurately • I can explore problem solving methods and begin to select the most efficient method for the problem • I can recall number bonds to 10 and 100 quickly • I can partition a three-digit number in order to add or subtract, and then recombine to find the answer • I can add and subtract numbers up to three-digits by recognising the value of the numeral in the column, for example identifying that the '3 and 4' represents '300 and 400'

	<ul style="list-style-type: none"> Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables 	<ul style="list-style-type: none"> I know that I can count on or back in order to solve missing number problems, using a number line or concrete maths equipment I know that quick recall of times tables will help me to become fluent in multiplication and division calculations 	<ul style="list-style-type: none"> I can identify the inverse calculation in order to check answers independently I can identify the most efficient method to solve a missing number problem, using equipment to help me I can recall multiplication facts for x3, x4 and x8 fluently
Spring Year 3	<ul style="list-style-type: none"> Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including two-digit numbers times one-digit numbers, using mental and progressing to formal written methods Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects Add and subtract amounts of money to give change, using both £ and p in practical contexts Interpret and present data using bar charts, pictograms and tables Solve one step and two step questions using information presented in scaled bar charts and pictograms and tables Measure, compare, add and subtract lengths (m, cm, mm) Measure the perimeter of simple 2D shapes 	<ul style="list-style-type: none"> I know that the facts that I already know can be used to help me find new multiplication and division tables mentally I know that formal methods can be used when multiplying two-digit numbers by one-digit numbers I know the correct order in which to multiply two numbers I know that there are different strategies to help me solve missing number problems I know the value of coins and can add and subtract them correctly I know that data can be presented in a variety of formats. I know that scales can be used to represent numerical increments I know that there are different units of measurement I know what the term <i>perimeter</i> means 	<ul style="list-style-type: none"> I can identify multiplication and division fact families and apply this knowledge to solve calculations mentally I can explain the process of the formal written method, demonstrating my understanding of place value I can choose the operation I need to find the answer to a number problem. I can use a strategy I have learned to find the answer and explain how I found the answer. I can write amounts of money using £ and the decimal point. I can sort data into charts and tables. I can interpret data that has been presented in a variety of formats I can present my own data in a variety of formats I can read scales accurately I can measure objects using m, cm and mm I can find the perimeter of a simple shape, and explain the real life application for measuring it I can count up and down in tenths I can find one tenth of a number I can find unit fractions of a set of objects (eg $\frac{1}{3}$ of 6)

	<ul style="list-style-type: none"> Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 Recognise, find and write fractions of a discrete set of objects; unit fractions and non-unit fractions with small denominators Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators 	<ul style="list-style-type: none"> I know that one whole is made up of ten equal parts I know that one tenth is found by dividing a number by ten I know what the terms <i>unit</i> and <i>non-unit</i> fraction mean 	<ul style="list-style-type: none"> I can find non unit fractions of a set of objects (eg $\frac{3}{5}$ of 10) I can write unit and non-unit fractions correctly I can recognise fractions in a variety of contexts
Summer Year 3	<ul style="list-style-type: none"> Recognise and show, using diagrams, equivalent fractions with small denominators Add and subtract fractions with the same denominator within one whole Compare and order unit fractions, and fractions with the same denominators Solve problems that involve all of the above Tell and write the time from an analogue clock, including using Roman numerals from I to XII and 12-hour and 24-hour clocks Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight 	<ul style="list-style-type: none"> I know that the same amount can be represented using different fractions I know that I should only add or subtract the numerator if the fractions have the same denominator I know that I should compare the numerator when ordering fractions with the same denominator I know that time on an analogue clock can be represented in a variety of ways I know that time can be measured in different amounts I know how to read the time accurately I know that there are 60 seconds in a minute I know how many days are in each month, including a leap year 	<ul style="list-style-type: none"> I can explain my understanding of equivalent fractions using mathematical equipment and diagrams I can add and subtract fractions such as $\frac{1}{5} + \frac{1}{5}$ or $\frac{5}{8} - \frac{3}{8}$ I can order unit fractions from smallest to greatest, or greatest to smallest (eg $\frac{1}{3}$ $\frac{1}{5}$ $\frac{1}{6}$ $\frac{1}{8}$) I can order non-unit fractions with the same denominator from smallest to greatest, or greatest to smallest (eg $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $\frac{1}{5}$) I can read the time on an analogue clock using 12 hour and 24 hour format. I can read Roman numerals from I to XII I can select and describe the appropriate measurements for specific activities I can use the correct vocabulary when talking about time I can use equipment to help me measure timed events

	<ul style="list-style-type: none"> • Know the number of seconds in a minute and the number of days in each month, year and leap year • Compare durations of events • Draw 2-D shapes, and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them • Recognise angles as a property of shape or a description of a turn • Identify right angles, recognise that two right angles make a half turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle • Identify horizontal and vertical lines and pairs of perpendicular and parallel lines • Measure, compare add and subtract mass, volume/capacity 	<ul style="list-style-type: none"> • I know how to draw common 2-D shapes with increasing accuracy • I know how a 3-D shape can be created using nets • I know that an angle is a measure of a turn, measured in <i>degrees</i> • I know that an angle is formed where two lines meet • I know that a right angle is exactly 90° • I know that that some angles are greater than others • I know how to describe lines when discussing the properties of shapes • I know the measurements <i>grams, kilograms, millilitres and litres</i> 	<ul style="list-style-type: none"> • I can record a timed event accurately in seconds, minutes or hours • I can explain why events are measured in different units of time • I can identify and represent the properties of 2-D shapes in my drawings • I can identify the 2-D shape faces of a 3-D shape and use this knowledge to help me create 3-D models • I can identify where I would find angles in shapes • I can recognise right angles in shapes • I can compare angles using the vocabulary <i>greater than</i> and <i>less than</i> • I can identify the number of right angle turns needed to create a half or three quarter • I can identify parallel, horizontal, vertical and perpendicular lines • I can select the correct measurement for my work on mass, volume and capacity
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Year 4

Term & Focus	National Curriculum Objectives	Knowledge	Skills
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<p>Autumn Year 4</p>	<ul style="list-style-type: none"> • Count in multiples of 6, 7, 9, 25 and 1000 • Find 1000 more or less than a given number • Count backwards through zero to include negative numbers • Recognise the place value of each digit in a four digit number • Order and compare numbers beyond 1000 • Identify, represent and estimate numbers using different representations • Round any number to the nearest 10, 100 or 1000 • Solve number and practical problems that involve all of the above and with increasingly large positive numbers • Read Roman numerals to 100 and know that over time, the numeral system changed to include the concept of zero and place value • Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation • Solve addition and subtraction two-step problems in contexts, deciding 	<ul style="list-style-type: none"> • I know how to count in steps of 25 and 1000 from memory • I know how to identify number patterns to help me count in multiples of 6, 7 and 9 • I know what a negative number is • I know that four digit numbers are made up of thousands, hundreds, tens and ones • I know that the value of the digits in a four-digit and five-digit number determines its place on a number line • I know that rounding makes a number simpler to work with but keeps its value very close to what it was • I know different strategies can be used to solve problems such as rounding and mental recall • I know how to read Roman numerals to 100 • I know that zero is an important number in its own right • I know how to write 4 digit numbers correctly using columnar notation • I know that inverse operations can be used to check answers • I know that some problems have more than one step to solve • I know how many <i>metres</i> are in a <i>kilometre</i> • I know how to calculate the <i>perimeter</i> of a rectangle or square 	<ul style="list-style-type: none"> • I can identify and apply patterns and rules in order to find the next number in the sequence, thinking about known facts such as doubles and halves to help me work out new multiplication facts • I can count backwards through zero to show my understanding of negative numbers • I can apply my understanding of place value to order and compare four-digit numbers • I can round any number to the nearest 10, 100 or 1000 • I can select the most efficient method to help me solve problems • I can represent numbers using Roman numerals • I can use zero as a place holder • I can add and subtract four-digit numbers using column method • I can estimate by rounding to help me check my answers • I can select an appropriate operation or method, • with an awareness of the <i>most efficient</i> way to solve the problem • I can represent lengths and distances in both metres and kilometres • I can apply my understanding of cm and m to convert measurements in a scaled drawing • I can recall multiplication facts for all times tables up to 12 x 12
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	<p>which operations and methods to use and why</p> <ul style="list-style-type: none"> • Convert between different units of measure in length (km to m) • Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • Recall multiplication and division facts for multiplication tables up to 12 x 12 • Use place value, known and derived facts to multiply and divide mentally, including multiplying by 0 and 1; dividing by 1; multiplying together three numbers 	<ul style="list-style-type: none"> • I know that quick recall of times tables will help me to become fluent in multiplication and division calculations • I know that I can easily multiply and divide numbers by 0 and 1, without needing to calculate formally • I know how to use facts I have learned already to multiply 3 numbers 	<ul style="list-style-type: none"> • I can apply this knowledge to help me now the related division facts • I can quickly multiply and divide numbers by 1 and 0
Spring Year 4	<ul style="list-style-type: none"> • Recognise and use factor pairs and commutativity in mental calculations • Multiply two-digit and three-digit numbers by a one-digit number using formal written layout • Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects • Find the area of rectilinear shapes by counting squares 	<ul style="list-style-type: none"> • I know that factor pairs can be used to write different calculations (eg 1 x 12, 12 x 1) • I know how to use a formal written method of multiplication • I know that a 2 digit number can be partitioned into tens and ones when multiplying by a single digit number • I know that to <i>scale up</i> I need to use multiplication and that division should be used to <i>scale down</i> • I know that the area is the space occupied by a flat shape or the surface of an object • I know that different fractions can represent the same number 	<ul style="list-style-type: none"> • I can use arrays to find different multiplication calculations with the same product • I can multiply two and three-digit numbers by a one-digit number • I can use distributive law in order to solve multiplication problems: <ul style="list-style-type: none"> • $x \ 4 = 10 \times 4 = 40$ • $4 \times 4 = 16$ • $40 + 16 = 56$ • I can calculate answers by choosing the correct operation, eg: To make 7 kg of concrete you need 2kg of sand. How much sand would you need to make 21 kg of concrete? • I can use squared paper in order to find the area of a shape

	<ul style="list-style-type: none"> • Recognise and show, using diagrams, families of common equivalent fractions • Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten • Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number • Add and subtract fractions with the same denominator • Recognise and write decimal equivalents of any number of tenths or hundredths • Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ • Find the effect of dividing a one- or two- digit number by 10 and 100, identifying the value of the digits in the answers as ones, tenths and hundredths • Round decimals with one decimal place to the nearest whole number 	<ul style="list-style-type: none"> • I know that one whole is made up of one hundred equal parts • I know that one hundredth is found by dividing a number by one hundred, or by dividing tenths by ten • I know the difference between unit and non-unit fractions • I know that different fractions can be added to create whole numbers • I know that if the denominator is the same, I add or subtract the numerators to find the total • I know that tenths and hundredths can be represented as a decimal number • I know that in order to find the decimal equivalent of a fraction, the denominator needs to be 100 • I know the place value of digits on either side of the decimal point • I know which digits in the tenths column round up to the nearest whole number 	<ul style="list-style-type: none"> • I can identify families of fractions and explain why they show equivalent numbers using mathematical equipment • I can count up and down in hundredths • I can find one hundredth of a number • I can add and subtract fractions with the same denominator • I can find equivalent decimals by dividing by 10 or 100 and record correctly using place value • I can spot patterns when dividing numbers by 10 or 100 • I can explain the value of a specified digit in a decimal number • I can identify which whole number the decimal number is closest to
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<p>Summer Year 4</p>	<ul style="list-style-type: none"> • Compare numbers with the same number of decimal places up to two decimal places • Solve simple measure and money problems involving fractions and decimals to two decimal places • Estimate, compare and calculate different measures, including money in pounds and pence • Convert between different units of measure (eg hours to minutes) • Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs • Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs • Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • Identify acute and obtuse angles and compare and order angles up to two right angles by size • Identify lines of symmetry in 2-D shapes presented in different orientations • Complete a simple symmetric figure with respect to a specific line of symmetry 	<ul style="list-style-type: none"> • I know how to compare numbers by looking at digits in the tenths and hundredths columns • I know that decimal numbers are used in real life situations • I know that fractions can be written as decimals • I know how many pence make a pound • I know why a decimal point is written between the pounds and pence • I know that I need to multiply or divide in order to convert between different units of time • I know that there are different ways to present data • I know that the <i>axes</i> represent different aspects of the data • I know that a range of information can be gathered from the bar chart, table or graph • I know that geometric shapes have specific properties • I know that a <i>quadrilateral</i> has 4 straight sides • I know that an acute angle is more than 0 degrees and less than 90 degrees • I know that an obtuse angle is more than 90 degrees but less than 180 degrees • I know that a <i>symmetrical</i> shape has two halves exactly the same • I know that a 2-D shape can have more than one line of symmetry 	<ul style="list-style-type: none"> • I can compare numbers up to 2 decimal places using < and > • I can read and write decimal numbers to solving problems using money, length or mass • I can convert $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$ into decimal numbers and apply my knowledge of equivalent fractions to find the decimal numbers • I can calculate and compare different amounts of money • I can quickly recall the number of seconds in a minute, minutes in an hour, hours in a day, days in a week and weeks in a year • I can gather my own data and present the information in a bar chart • I can decide which scale is the most appropriate for my bar chart • I can use the information from the chart or graph to solve problems • I can identify regular and irregular geometric shapes by considering their properties • I can name different quadrilaterals and triangles • I can identify how many degrees are in a right angle • I can draw an acute/obtuse angle • I can estimate the size of an angle • I can find a line of symmetry in a 2-D shape by folding or drawing • I can find a line of symmetry in different orientations of the same shape • I can complete a pattern in order to make it symmetrical
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	<ul style="list-style-type: none"> Describe positions on a 2-D grid as coordinates in the first quadrant Describe movements between positions as translations of a given unit to the left/right and up/down Plot specified points and draw sides to complete a given polydron 	<ul style="list-style-type: none"> I know that patterns can have a line of symmetry I know that coordinates are written in pairs I know that coordinates should be read in a specific order (x axis first, then y axis) I know that positions on a grid can be translated to show movement I know that points plotted on a grid need to be accurate 	<ul style="list-style-type: none"> I can identify the x and y axis on a grid I can place a mark on the grid using specific coordinates I can give the coordinates for a specified object on a grid I can describe how the object has moved I can read, write and use pairs of co-ordinates accurately
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Year 5

Term & Focus	National Curriculum Objectives	Knowledge	Skills
Autumn Year 5	<ul style="list-style-type: none"> Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 	<ul style="list-style-type: none"> I know how to read and write numbers to 1 000 000 I know what the different powers of 10 are (eg 10, 100, 1000, 10 000, 100 000) I know that negative numbers are used in real life contexts such as temperature I know which digit to focus on when rounding numbers within 1 000 000 I know when it might be important to round in a real life context I know how to read Roman numerals to 1000 I know that in addition and subtraction some numbers will need to be 	<ul style="list-style-type: none"> I can apply my understanding of place value to order and compare numbers to at least 1 000 000 I can count in powers of 10 up to 1 000 000 from any given number I can count back in powers of 10 from any given number I can count back from positive integers through zero to negative integers I can plot negative and positive integers on a scale I can correctly round up to the nearest 10,100, 1000, 10 000 and 100 000 I can interpret the language of rounding in order to solve problems

	<ul style="list-style-type: none"> • Solve number problems and practical problems that involve all of the above • Read Roman numerals to 1000 (M) and recognise years in Roman numerals • Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • Add and subtract numbers mentally with increasingly large numbers • Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Solve comparison, sum and difference problems using information presented in a line graph • Complete, read and interpret information in tables, including timetables • Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers 	<p><i>exchanged</i> and this will affect the numbers in the columns</p> <ul style="list-style-type: none"> • I know that I can use strategies such as <i>partitioning, adjusting, rounding, doubling</i> and <i>halving</i> to calculate mentally • I know that there will be key vocabulary and information that I need within the problem • I know why a line graph is different/similar to a bar graph • I know that line graphs are seen in various real life contexts, such as temperature records and traffic surveys • I know the meaning of the words <i>multiple, factor</i> and <i>product</i> • I know that a <i>prime</i> number only has 2 factors • I know that <i>composite</i> numbers have more than 2 factors • I know that 1 is not a prime number because it only has one factor • I know that when multiplying by 10, 100 or 1000 the digit places move to the left, and when dividing they move to the right • I know how to break a composite <i>rectilinear</i> shape into 2 rectangles • I know that when measuring area I need to use <i>squared</i> measurements • I know how to estimate the area of irregular shapes 	<ul style="list-style-type: none"> • I can identify years when written as Roman numerals • I can add and subtract five and six-digit numbers, representing my learning using mathematical equipment and column method correctly • I can select the most efficient method to help me solve mental calculations with increasing accuracy and fluency • I can decide which operation is needed and select a method that would be appropriate to solve the problem • I can identify information presented on a line graph and solve problems accordingly • I can complete intervals on an axes and estimate readings that fall between the intervals • I can compare results to find the difference or sum of the recorded points • I can find common factors and factor pairs of given numbers • I can recall prime numbers up to 19 • I can establish if a number is prime up to 100, using mathematical resources • I can explain why I can use multiplying by 100 to help me multiply by 1000 • I can measure the perimeter of each rectangle and then add measurements to find the final perimeter
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	<ul style="list-style-type: none"> • Know and use the vocabulary of prime numbers, prime factors and composite (non prime) numbers • Establish whether a number up to 100 is prime and recall prime numbers up to 19 • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes 		<ul style="list-style-type: none"> • I can use standard units of measurement to find the area of rectangles and squares and record correctly • I can use known and derived measurements to make estimations and explain reasons for my answers
Spring Year 5	<ul style="list-style-type: none"> • Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers • Multiply and divide numbers mentally drawing upon known facts • Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context 	<ul style="list-style-type: none"> • I know that it is important to set out multiplication using columns correctly • I know that zero is important as a place holder • I know key multiplication facts for any times table up to 12 • I know how to apply mental arithmetic skills in order to write short division calculations • I know that some numbers do not divide exactly and that a remainder is the amount that is 'left' • I know how to find a common denominator when all denominators are multiples of the same number 	<ul style="list-style-type: none"> • I can apply strategies learnt in Year 4 to multiply numbers up to 4-digits by 1-digit • I can use mathematical equipment and methods such as an area model to multiply numbers up to 4 digits by a 2 digit number • I can recall known facts and adjust accordingly to solve mental multiplication and division calculations • I can recall key division facts to enable me to record division calculations using the short division method • I can discuss the significance of remainders within the context of a number story, understanding which situation would require us to focus only on the remainder

	<ul style="list-style-type: none"> • Compare and order fractions whose denominators are all multiples of the same number • Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths • Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1 \frac{1}{5}$] • Add and subtract fractions with the same denominator and denominators that are multiples of the same number • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams • Read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$] • Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • Round decimals with two decimal places to the nearest whole number and to one decimal place • Read, write, order and compare numbers with up to three decimal places 	<ul style="list-style-type: none"> • I know how to write equivalent fractions of a given fraction • I know that an improper fraction is a fraction where the numerator is greater than the denominator ($\frac{6}{5}$) • I know that a mixed number is a number that consists of an integer and a proper fraction ($1\frac{1}{5}$) • I know that I can convert fractions that have denominators that are multiples of each other in order to add or subtract them • I know that when a fraction is multiplied by a whole number, the denominator remains the same and the numerator is multiplied by the whole number • I know the common language involved in working with fractions and decimals (eg tenths, hundredths and thousandths) • I know the order of place value up to 3 decimal places • I know how to round a decimal to the nearest whole number • I know which digits to compare when ordering numbers with decimal places 	<ul style="list-style-type: none"> • I can use models to show different fractions and order them accordingly • I can explain how fractions are equivalent using visual representations • I can represent improper fractions using mathematical equipment • I can discuss how many parts are in a whole in order to convert improper fractions into a mixed fraction, using equipment to help me • I can use models such as the bar model to help me convert fractions to have the same denominator, before adding or subtracting • I can represent my learning by using repeated addition models • I can use models such as base 10 and 100 grids to represent and describe fractions and decimals • I can explain how a decimal number is made up (0.3 has zero ones and 3 tenths.) I can convert this to a fraction by shading in 3 tenths of the grid ($\frac{3}{10} = \frac{30}{100}$) • I can correctly identify the value of digits to 3 decimal places
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<p>Summer Year 5</p>	<ul style="list-style-type: none"> • Solve problems involving number up to three decimal places • Recognise the per cent symbol (%) and understand that per cent relates to ‘number of parts per hundred’, and write percentages as a fraction with denominator 100, and as a decimal • Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$ • $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$ and those fractions with a denominator of a multiple of 10 or 25. • Identify 3-D shapes, including cubes and other cuboids, from 2-D representations • Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles • Draw given angles, and measure them in degrees ($^{\circ}$) • Identify: <ul style="list-style-type: none"> • angles at a point and one whole turn (total 360°) • angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) • other multiples of 90° • Use the properties of rectangles to deduce related facts and find missing lengths and angles • Distinguish between regular and irregular polygons based on 	<ul style="list-style-type: none"> • I know which digit(s) to focus on when solving problems • I know that the term <i>one per cent</i> means one part in every hundred • I know that 100% = the whole • I know the relationship between fractions (with denominator of 100), decimals and percentages • I know how to identify what $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$ and $\frac{3}{5}$ looks like as a shape and number value either as a decimal or percentage • I know the properties of 3D shapes • I know what the terms <i>acute</i>, <i>obtuse</i> and <i>reflex</i> mean • I know how to use a protractor accurately • I know that there are 360° in a whole turn • I know how to find other angles that are multiples of 90° • I know the generic properties of all rectangles • I know angle sum facts • I know how to identify and name a polygon • I know the difference between regular and irregular polygons • I know that a shape can be moved to a different position without changing its shape • I know that this movement can be described as a <i>reflection</i> or <i>translation</i> 	<ul style="list-style-type: none"> • I can apply my knowledge of decimal places to solve problems • I can identify and use the symbol % in my work • I can write percentages as a fraction and decimal • I can apply my understanding to solve problems by exploring the relationship between different denominators • I can identify a 3D shape from a 2D representation by observing the properties represented • I can use these terms correctly when talking about my work • I can draw lines and measure the angles with a protractor, stating the correct measurement in degrees • I can use this fact to recall other measurements (180° in a straight line or half turn, 90° in a quarter turn or right angle) • I can apply this knowledge to deduce missing lengths and angles • I can make reasoned decisions based on my understanding of angles and length of sides. • I can use a 2-D grid and co-ordinates in the first quadrant to create my own reflections and translations • I can use my knowledge of place value and multiplication/division to convert between standard measurements (eg grams to kilograms)
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	<p>reasoning about equal sides and angles.</p> <ul style="list-style-type: none"> • Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed. • Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • Estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water] • Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling. 	<ul style="list-style-type: none"> • I know all forms of metric measurement • I know equivalent measurements (eg $100\text{cm} = 1\text{ m}$, $1000\text{g} = 1\text{kg}$) • I know the imperial units that are also used in measurement (eg inches, pounds, pints) • I know what the term 'cubed' means and how to write it in my work (eg cm^3) • I know how to estimate the volume and capacity of a container • I know how to convert between different measurements • I know how to read for key information in order to solve a problem 	<ul style="list-style-type: none"> • I can recall the approximate equivalent of metric and imperial units (eg 1 inch = approx. 2.5 cm) • I can use this knowledge to help me estimate and solve problems using different units of measurement • I can estimate the volume or capacity of a container using my understanding of cm, millilitres and litres • I can apply the four operations to solve measurement problems involving conversions (eg days to weeks), and using decimal notation (eg grams to kilograms)
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Year 6

Term & Focus	National Curriculum Objectives	Knowledge	Skills
<p>Autumn Year 6</p>	<ul style="list-style-type: none"> • Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • Round any whole number to a required degree of accuracy • Use negative numbers in context, and calculate intervals across zero • Solve number and practical problems that involve all of the above. • Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • Perform mental calculations, including with mixed operations and large numbers 	<ul style="list-style-type: none"> • I know how to read, write order and compare numbers up to 10 000 000 • I know which digit to focus on when rounding any whole number • I know that there are different contexts where negative numbers might be used • I know how to look for key vocabulary in a word problem • I know there are different methods to multiply large numbers • I know there are different methods to divide large numbers • I know there are different methods to divide large numbers • I know there are different methods to calculate mentally • I know what <i>common factors</i>, <i>common multiples</i> and <i>prime numbers</i> are • I know that calculations using the four operations should be completed in an order • I know how to identify key information in order to solve a problem 	<ul style="list-style-type: none"> • I can apply my understanding of place value to compare and order numbers • I can use place value to round a whole number accurately • I can count up or back through zero and calculate intervals between negative and positive numbers • I can solve problems by applying my knowledge of the whole number system • I can use the formal written method of long multiplication accurately • I can use the formal written method of long division accurately • I can explain and demonstrate remainders as a whole number or fraction, or round the answer according to the context • I can use the formal written method of short division accurately • I can interpret remainders according to the context • I can undertake mental calculations with increasingly large numbers • I can recall common factors, multiples and prime numbers efficiently • I can apply my understanding of the order of operations including using brackets, for example • $(2+1) \times 3 = 9$

	<ul style="list-style-type: none"> • Identify common factors, common multiples and prime numbers • Use their knowledge of the order of operations to carry out calculations involving the four operations • Solve problems involving addition, subtraction, multiplication and division • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. • Use common factors to simplify fractions; use common multiples to express fractions in the same denomination • Compare and order fractions, including fractions > 1 • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] • Divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] • 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. 	<ul style="list-style-type: none"> • I know that fractions can be simplified • I know that fractions can be expressed in a variety of ways • I know how to express a fraction of an amount or shape that is greater and smaller than 1 • I know how to convert fractions • I know that when multiplying simple pairs of proper fractions I need to multiply the numerator and also the denominator • I know that when dividing proper fractions by whole number I need to convert the whole number into a fraction • I know the terms <i>co-ordinates</i> and <i>quadrant</i> • I know what the x and y axes are 	<ul style="list-style-type: none"> • I can identify the operations needed and the order in which to attempt the problem • I can use estimation to check if my answer could be accurate • I can recall common factors to help me simplify fractions efficiently • I can recognise when a fraction greater than 1 relates to a real life situation • I can add and subtract fractions with different denominators and mixed number fractions • I can multiply pairs of proper fractions and then find the answer in its simplest form • I can convert the whole number into a fraction • I can understand the procedure to divide proper fractions by whole numbers • I can identify the different quadrants • I can apply the rules to locate and describe positions on the full co-ordinate grid
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<p>Spring Year 6</p>	<ul style="list-style-type: none"> • Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example $\frac{3}{8}$] • Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places • Multiply one-digit numbers with up to two decimal places by whole numbers • Use written division methods in cases where the answer has up to two decimal places • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. • 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. • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate 	<ul style="list-style-type: none"> • I know how to convert a fraction into a decimals and vice versa • I know the value of the digits in numbers with up to 3 decimal places • I know the procedures to multiply numbers with decimal places by whole numbers • I know the procedures to divide decimal numbers by a whole number • I know the relationship between fractions, decimals and percentages • I know that symbols and letters can be used to represent <i>unknowns</i> in mathematical situations • I know how to write missing number problems using algebra • I know that different pairs of numbers could be used to satisfy an equation • I know that a logical approach will help me to find many possible answers • I know how to convert units of measure using decimal notation • I know how to use a number line to add and subtract positive and negative integers • I know the different ways in which longer distances are measured • I know the meaning of the terms <i>area</i> and <i>perimeter</i> • I know how to use <i>formulae</i> to solve mathematical problems 	<ul style="list-style-type: none"> • I can explore equivalence between simple fractions and decimals and explain my understanding • I can multiply or divide by 10, 100 and 1000 to give answers up to 3 decimal places • I can apply my understanding to solve simple calculations and within a real life context (eg money and length) • I can identify when this would be used in a real life context (eg money and length) • I can recall and use equivalences between simple fractions, decimals and percentages in a range of contexts • I can apply my understanding in the context of missing numbers, lengths, co-ordinates and angles • I can identify see the relationship between number patterns in order to write and solve algebraic problems • I can solve equivalent expressions (eg $a + b = b + a$) • I can demonstrate my understanding of a logical approach • I can quickly recall the knowledge to help me convert measurements, including decimal places • I can identify key procedures needed in order to solve problems • I can recall approximate conversions in order to tell if an answer is sensible
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	<ul style="list-style-type: none"> • 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 • Convert between miles and kilometres • Recognise that shapes with the same areas can have different perimeters and vice versa • Recognise when it is possible to use formulae for area and volume of shapes • Calculate the area of parallelograms and triangles • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units [for example, mm³ and km³]. • Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison 	<ul style="list-style-type: none"> • I know how to determine the area of a rectangle using the correct formulae • I know how to calculate and compare the volume of cubes and cuboids using standard units • I know how to look for the relationship between numbers • I know how to find key percentages (1, 10, 50) of an amount • I know how to use formulae to find the scale factor • I know how to use procedures to solve problems involving unequal sharing and grouping 	<ul style="list-style-type: none"> • I can investigate and identify shapes that have the same area but a different perimeter and vice versa • I can identify when it is possible to use formulae to find the area and volume of shapes • I can relate the area of rectangles to parallelograms and triangles by dissection and use formulae to do this • I can make reasoned estimations in order to tell if my answer is sensible • I can select the appropriate operation (multiplication or division) to scale up or down • I can apply this in real life settings such as recipes • I can adjust by adding or subtracting to find the exact percentage • I can use ratio to compare quantities and make scale drawings and begin to use notation to record my work • I can use models and equipment to demonstrate ratio in real life settings (<i>eg For every egg you need 3 spoonfuls of flour</i>)
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	<ul style="list-style-type: none"> • Solve problems involving similar shapes where the scale factor is known or can be found • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. 		
Summer Year 6	<ul style="list-style-type: none"> • Draw 2-D shapes using given dimensions and angles • Recognise, describe and build simple 3-D shapes, including making nets • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. • Interpret and construct pie charts and line graphs and use these to solve problems • Calculate and interpret the mean as an average. • Solve addition and subtraction multi-step problems in contexts, deciding 	<ul style="list-style-type: none"> • I know how to identify the properties of 2D shapes • I know how to identify the properties of 3D shapes and what the net of this shape might look like • I know how to derive unknown angles in any triangle, quadrilateral and regular polygon • I know what the terms <i>radius</i>, <i>diameter</i> and <i>circumference</i> mean • I know that the diameter is twice the radius • I know how to identify angles that are missing • I know how to interpret the data shown on pie charts and line graphs • I know the procedure to calculate the mean as an average • I know how to decide the order in which to solve problems • I know how to read the information in order to decide the operations needed 	<ul style="list-style-type: none"> • I can use measuring tools accurately to draw 2D shapes • I can use I can use measuring tools accurately to draw 3D shapes, using markings and labels for lines and angles • I can recall the sum of interior angles in triangles, • quadrilaterals and regular polygons and use this to help me identify unknown angles • I can explain my understanding by labelling different parts of a circle and finding the diameter or radius from a given measurement • I can recall the sum of angles on a straight line or a quadrilateral. I can use addition and subtraction to find missing angles • I can construct my own pie chart or line chart to represent the data given • I can identify when it is appropriate to find the mean of a data set • I can identify key information in order to solve multi-step problems • I can use the four operations efficiently to help me solve problems

	<p>which operations and methods to use and why</p> <ul style="list-style-type: none">• Solve problems involving addition, subtraction, multiplication and division• Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	<ul style="list-style-type: none">• I know how to make reasoned estimations	<ul style="list-style-type: none">• I can apply prior knowledge in order to estimate with increasing accuracy
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4.0 Maths Curriculum Resources







4.1 Example Medium Term Plan

Spring 1	Unit outcomes	Manipulatives & Resources	NC Objectives to be taught	RTP stands to be explicitly reviewed
Percentages (1 weeks)	<ul style="list-style-type: none"> Children use known fractional equivalences to find percentages of amounts Children build on the last step by finding multiples of 10% and other known percentages. They explore different methods of finding certain percentages e.g. Finding 20% by dividing by 10 and multiplying by 2 or by dividing by 5. They also explore finding 5% by finding half of 10%. Using these methods, children build up to find percentages such as 35%. Children use their understanding of percentages to find the missing whole or a missing percentage when the other values are given. 	FDP equivalence blocks	<ul style="list-style-type: none"> Recognise the per cent symbol (%) and understand that per cent relates to “number of parts per 100”, and write percentages as a fraction with denominator 100, and as a decimal fraction. 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 fractions with a denominator of a multiple of 10 or 25. 	
Ratio and proportion (2 weeks)	<ul style="list-style-type: none"> Children will understand that a ratio shows the relationship between two values and can describe how one is related to another. They will start by making simple comparisons between two different quantities. For example, they may compare the number of boys to girls in the class. They use objects and diagrams to compare ratios and fractions. Children are introduced to the colon notation as the ratio symbol, and continue to link this with the language ‘for every..., there are...’ Children should be able to draw 2-D shapes on a grid to a given scale factor and be able to use 	Cuisenaire	<ul style="list-style-type: none"> Solve problems involving the relative sizes of two quantities, where missing values can be found by using integer multiplication and division facts. Solve problems involving the calculations of percentages (e.g. Of measures) such as 15% of 360 and the use of percentages for comparison. Solve problems involving similar shapes, where the scale factor is known or can be found. 	6AS/MD3 solve problems involving ratio relationships

	<p>vocabulary, such as, “Shape A is three times as big as shape B”.</p> <ul style="list-style-type: none"> Children will apply the skills they have learnt in the previous steps to a wide range of problems in different contexts 		<ul style="list-style-type: none"> Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. 	
Algebra (2 weeks)	<ul style="list-style-type: none"> Children use algebraic notation to form one-step equations. Children solve simple one step equations involving the four operations. Children progress from solving equations that require one-step to equations that require two steps Children find possible solutions to equations which involve multiples of one or more unknown 	<p>Concrete resources ie cubes, counters</p>	<ul style="list-style-type: none"> 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>6AS/MD–4 Solve problems with 2 unknowns.</p>
Measure (2 weeks)	<ul style="list-style-type: none"> Children will find and draw rectilinear shapes that have the same area. Children should calculate area and perimeter of rectilinear shapes. Children use their knowledge of finding the area of a rectangle to find the area of a right-angled triangle. Children will extend their knowledge of working out the area of a right-angled triangle to work out the area of any triangle. Children should understand that volume is the space occupied by a 3-D object. Children to use the formula ($l \times w \times h$) for calculating the volume of cuboids. 	<p>2D and 3D shapes</p> <p>String</p>	<ul style="list-style-type: none"> Recognise that shapes with the same areas can have different perimeters and vice versa. Recognise when it is possible to use formulae for area and volume of shapes. Calculate the area of parallelograms and triangles. Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units [for example, mm³ and km³]. 	<p>5G–2 Compare areas and calculate the area of rectangles (including squares) using standard units.</p>



4.2 Lesson Structure



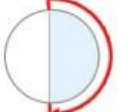
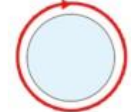
The 6 phase lesson structure

	Monthly review task- 1-5 questions carefully selected based on prior learning.
	Daily review task- based on previous days learning, picking up on a misconception or challenging the children.
	Teacher modelling and explaining -using small steps.
	Guided practice- use of cold calling, partner work and coral response.
	Independent task- teacher to circulate or work with a small group as required.
	Plenary- discussion based question pulling together the days learning.

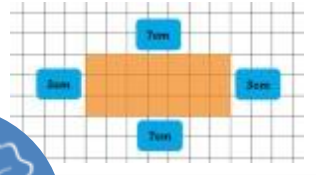
4.3 Example Knowledge Organiser

Year 3 Knowledge Organiser

Unit Fraction	Non-unit Fraction	Horizontal	Vertical		Roman Numerals		Days in a Month
Any fraction with 1 as its numerator (top number)	Any fraction with a numerator (top number) greater than 1				1 I		January 31 days
					2 II		February 28 days
					3 III		March 31 days
					4 IV		April 30 days
					5 V		May 31 days
					6 VI		June 30 days
					7 VII		July 31 days
					8 VIII		August 31 days
					9 IX		September 30 days
					10 X		October 31 days
					11 XI		November 30 days
					12 XII		December 31 days

Angles as Turns	
	
One right angle is one quarter turn	Three right angles is a three-quarter turn
	
Two right angles are one half turn	Four right angles is a full turn

AM = Before midday	60 seconds = 1 minute	10mm = 1 cm
PM = After midday	60 minutes = 1 hour	100cm = 1m
Midday = 12:00	24 hours = 1 day	1,000g = 1kg
		1,000ml = 1l

Perimeter					
Perimeter is the total length of the outside of a shape.					
					

12am 00:00	4am 04:00	8am 08:00	12pm 12:00	4pm 16:00	8pm 20:00
1am 01:00	5am 05:00	9am 09:00	1pm 13:00	5pm 17:00	9pm 21:00
2am 02:00	6am 06:00	10am 10:00	2pm 14:00	6pm 18:00	10pm 22:00
3am 03:00	7am 07:00	11am 11:00	3pm 15:00	7pm 19:00	11pm 23:00

5.0 Greater Depth

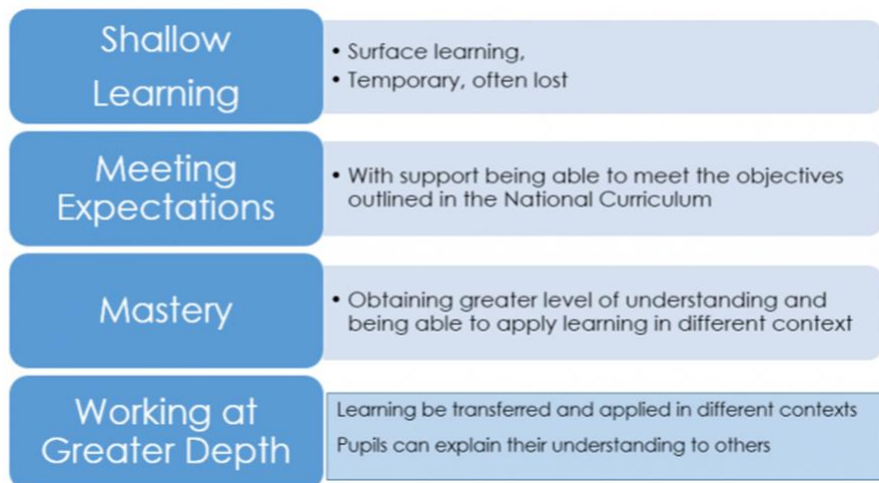
5.1 What is Greater Depth?

At Avonwood school, we believe that all children are entitled to an education appropriate to their needs. Our school values all children equally and endeavours to ensure that each child should have the opportunity to realise their potential in a challenging and supportive environment. All children require the right level of challenge to bring out the best in themselves.

Here at Avonwood, opportunities for deeper learning are given to all children in every maths lesson. Learning at greater depth requires a higher order ability where children have the potential to develop beyond what is expected for their age.

Working at greater depth appears frequently in the National Curriculum framework, but what does it mean? Working at greater depth means acquiring a deep, long-term, secure and adaptable understanding of the subject. Children who are working at greater depth will be fluent in the fundamentals of mathematics; they will be able to solve problems by applying what they know to a variety of different contexts; and they will be able to reason mathematically. However, they should also be challenged by a range of rich and sophisticated problems before being accelerated onto new content. Greater depth is about working on content at a deeper level therefore greater depth children should be able to independently explore and investigate mathematical concepts as well as being able to clearly and precisely explain their findings by making links to prior knowledge.

This diagram helps to clarify the concept of mastery and greater depth in the national curriculum:



The Characteristics of mastery and greater depth in the national curriculum could therefore be summarised as:

Independence	• Apply the skill or knowledge without recall to the teacher
Fluency	• Apply the skill and knowledge with a high level of confidence and show good resilience when the task seems demanding.
Application	• Apply the skill and knowledge to a range of different contexts, including other areas of the curriculum.
Consistency	• Consistently use their skills, knowledge and understanding.
Synthesise	• Organise ideas to make connections with other areas of learning and new areas.
Re-visit	• Return to this aspect of learning after a break and still feel confident that they can work on the skill and knowledge without difficulty.
Explain it	• Able to explain others their understanding and perhaps be a learning buddy to others

5.2 Greater Depth at Avonwood

Here at Avonwood primary school, we have developed several greater depth resources to ensure more students acquire a greater depth of understanding. Following the Rosenshine principles of instruction, content is presented incrementally, in small steps, with deepening layers of complexity. Teachers skilfully ask different questions of different children at the right point in learning to both address common misconceptions and provide opportunities for higher order thinking. This encourages greater depth children to articulate their learning by explaining how they generated a solution.


Our greater depth tool kit is displayed in all the classrooms and children have the opportunity to complete one or more of the activities once they have demonstrated a secure understanding of the learning. The aim of the toolkit is to get children to think deeper about a given concept and for them to have the opportunity to prove their understanding in more than one way. The children are encouraged to reflect on their learning and to move themselves up the school's behaviour chart if they have met one of our eight key areas.

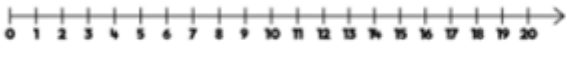
Avonwood Greater Depth Toolkit

The toolkit consists of eight numbered activities arranged in a 2x4 grid:

- 01 Bar Model:** Use the bar model strategy to solve one of your calculations and explain how you did it. Includes a diagram of a bar divided into 'Whole' and two 'Part' sections.
- 02 Word Problem:** Create your own word problem based on the learning you have done today and solve it. Includes a thought bubble icon.
- 03 Different Methods:** Find as many ways of answering one of the questions as you can. Includes a branching arrow icon.
- 04 Instructions:** Write instructions to a friend to explain how you worked out one of your calculations. Includes a checklist icon.
- 05 Letter:** Write a letter to an absent friend explaining what you have done in your maths lesson today. Includes a letter icon.
- 06 Top Tips:** Write a list of 'Top Tips' explaining common mistakes to watch out for. Includes a lightbulb icon.
- 07 Prove it!:** Represent your answer in at least 3 different ways. Includes a document with a checkmark icon.
- 08 Inverse Operations:** Use the inverse operation(s) to check your answers on this page. Includes a circular arrow icon.

Our Golden Acorn challenges are planned as an additional challenge for any children who have demonstrated a secure understanding of their learning and require an extra challenge to deepen their understanding and thinking. These questions may either be linked to the current learning goal or may link to prior learning to check for understanding away from the point of teaching. Across the school these questions encourage children to apply their knowledge and to develop written explanations of their thinking.

How many ways can you complete this number sentence?
Use the number line to help you. 




$\square - \square = 11$

Year 1 Golden Acorn example

Always, Sometimes, Never?

If one denominator is a multiple of the other you can simplify the fraction with the larger denominator to make the denominators the same.

Example:

Could $\frac{?}{4}$ and $\frac{?}{12}$ be simplified to $\frac{?}{4}$ and $\frac{?}{4}$? 

Prove it.

Year 5 Golden Acorn example

5.3 Greater Depth Assessment

Avonwood Primary school uses PUMA (Progress in Understanding Mathematics Assessment) to reliably assess, track and predict pupil progress in maths across the primary years. PUMA provides comprehensive information on each pupil - including their Mathematics Age and a diagnostic profile across all the strands of the new curriculum. This allows us to confidently identify our greater depth children. These assessments take place termly.

At Avonwood Primary school we are constantly monitoring the progress of all children. As well as evidence demonstrated in class books, we also use Rising Stars papers to benchmark progress against schools nationally. This provides a raw score for every child which converts into an indication of their working level against age related standards. Children are then discussed as part of our termly pupil progress meetings.

5.4 Greater Depth Concerns

The approach of teaching for mastery can give the impression of moving at a slower pace or persisting with topics parents may feel have been conquered. It is important to remember that mastery is all about the ability to retrieve, execute and connect prior knowledge; so whilst it may look like progress is not as rapid as expected, it may be that your child is not demonstrating true mastery of the content. Having read this policy, if you feel that there are aspects we have not considered well enough in your child's mathematical journey then please follow these steps:

1. Request a meeting with the class teacher
2. At the meeting, review the exercise book and check for Golden Acorn challenges being completed frequently with full working of the problem.
3. If still concerned, request a meeting with the Maths Lead.

6.0 Assessment

6.1 Summative assessment.

Statutory assessments

Multiplication tables check: From the 2021/22 academic year, the MTC is statutory for all year 4 pupils registered at state-funded maintained schools, special schools or academies (including free schools) in England. This will take place in Summer 1 and the results will be communicated to parents as part of our annual reports.

KS1 mathematics test: The mathematics test comprises 2 components, presented to pupils as 2 test papers: Paper 1: arithmetic consists of a single test paper and takes approximately 20 minutes. Paper 2: reasoning consists of a single test paper and takes approximately 35 minutes. The paper includes a practice question and 5 aural questions. After the aural questions, the time allowed for the remainder of the paper should be around 30 minutes. These take place during Summer 1 and the results will be communicated to parents as part of our annual reports.

KS2 mathematics test: The mathematics test focuses on the assessable elements of the mathematics programmes of study and comprises of 2 components, arithmetic and reasoning, presented to pupils as 3 test papers. Paper 1 assesses arithmetic. Pupils will have 30 minutes to answer the questions, which are worth 40 marks in total. Papers 2 and 3 assess reasoning. For each paper, pupils will have 40 minutes to answer the questions, which are worth 35 marks per paper. These take place during Summer 1 and the results will be communicated to parents as part of our annual reports.

United Learning assessments

PUMA: Progress in Understanding Mathematics Assessment (PUMA) enables schools to reliably **assess**, track and predict pupil progress in maths across the primary years. Provides comprehensive information on each pupil - including their Mathematics Age and a diagnostic profile across all of the strands of the new curriculum. These assessments take place termly and generate that informs pupil progress meetings and intervention strategies across the school.

Internal assessments

Arithmetic papers: KS2 complete weekly arithmetic papers to ensure that we are regularly reviewing the 4 operations as these underpin so much of the curriculum.

Times table quizzes: Year 3-5 take part in weekly times table quizzes focusing on the appropriate times table. Once completed these are completed, they receive a certificate and move onto the next level. This structured system ensures that children are regularly reviewing all prior knowledge whilst moving onto new times tables

6.2 Formative assessment.

Monthly reviews: 1-5 stagers are used across the school to review prior learning and to ensure understanding away from the point of teaching. Misconceptions are addressed either within the lesson or during interventions.

Daily reviews: review questions are used to check for understanding based on the previous days learning and to ensure knowledge is being built upon.

Questioning: Through our use of carefully planned questions throughout the lessons, teachers are checking children's understanding and acting upon any misconceptions. Through the structure of the lesson, teachers ensure that knowledge is built upon, and a plenary is used to ensure the children are ready to progress in the next lesson.

Marking: staff are expected to mark their maths books daily by circulating the classroom. This enables staff to notice and respond to misconceptions within the lesson via mini-plenaries ("Pit Stops"). There is evidence of an adult looking at children's work every day.

Plenaries: activities such as always, sometimes and never or exit tickets are used to generate insights into what children have grasped from that particular lesson. This enables effective decisions to be made around what the next steps in learning are.

7.0 Roles and Responsibilities

7.1 Class Teacher

It is the teachers' role to be aware of and follow the guidance contained within this policy. They should seek advice from the subject leader if they are unsure of knowledge content or how best to tackle a unit of work.

Teachers are responsible for day-to-day aspects that secure the best possible outcomes for all children, including:

- Produce daily lessons in line with the 6-phase lesson approach.
- Produce Medium Term Plans to frame the teaching and learning for each unit. - Promote their subject through signposting staff to up-to-date resources and subject specific evidence-based research.

7.2 Subject Leader

The roles of the subject leader are to:

- Create an annual action plan.
- Plan and monitor a progressive Long Term Plan using the National Curriculum as a base and using the School Curriculum Intents to tailor their subject provision to suit our children, which is chunked into units for each year group.
- Support staff through planned CPD events and ad-hoc requests for assistance with knowledge or planning.
- Evaluate and monitor interventions.
- Write and update whole school calculation policy.
- Write and update whole school fluency policy.
- Monitor and update greater depth strategy.
- Monitor and evaluate whole school data.
- Oversee the delivery of the subject through:
 - learning walks
 - book looks
 - pupil voice
 - subject audits
 - regular drop ins

- Hold parent workshops.
- Meet with their SLT link to update them with current developments in research and thinking.
- Ensure there are sufficient resources for the subject to be taught effectively and efficiently.
- Ensure this policy is up to date and fit for publishing.

7.3 Senior Leadership Team

Each subject will have an SLT link/ Their roles are to:

- Support the subject leader to:
 - Be an advocate for the subject
 - Oversee the delivery of their subject through assisting with learning walks, book looks and pupil voice
 - Enable their subject leader to have sufficient CPD opportunities to develop staff knowledge.
 - Implement their action plan. - Work together so that school priorities can be identified, and prevent all subjects from being promoted and developed at the same time