Overton St Helen's CE Primary School

Surrounded by God, we inspire hearts and minds through learning, faith and love.

'Let your light shine before others, that they may see your good deeds and glorify your Father in heaven' (Matthew 5: 16)

MATHS POLICY

School Vision

We encourage children to be respectful, forgiving and compassionate. We are a nurturing, inclusive and safe community built on Christians Values that inspire positive trusting relationships between school, families and the wider world.

We aim high, engaging children in a dynamic and diverse curriculum with opportunities and experiences that allow them to excel, through discovering their unique talents, relishing challenges with courage and perseverance, knowing that God is with them.

INTENT

Rationale

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. In a dynamic and engaging Mathematics curriculum, children can aim high and relish the diverse challenges the subject offers. A high-quality mathematics education therefore provides a foundation for understanding the world that God created, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Aims and Objectives

At Overton St Helen's we provide high quality teaching and learning in Maths, providing children with opportunities too:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

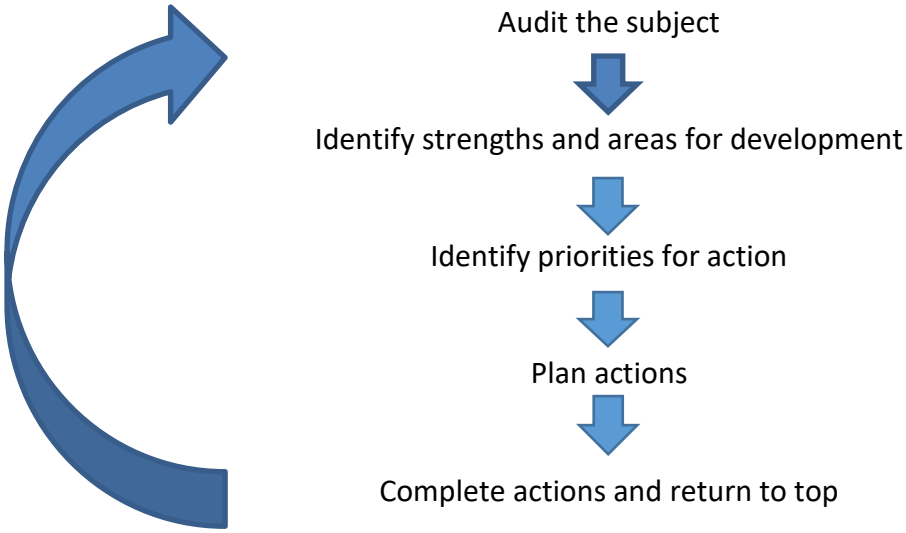
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems, revisiting more fundamental concepts regularly. They should also apply their mathematical knowledge to science and other subjects. The expectation is that most pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Role of Subject Leader

The Maths Subject Leader is responsible for:

- Ensuring progression and continuity through and across the Key Stages.
- Motivating and supporting colleagues in the implementation of their planning and providing guidance on where to find suitable resources for each unit of work – online and concrete as well as resources that support a more in-depth approach to maths.
- Monitoring progress and standards within Maths, identifying strengths, weaknesses and priorities for development.
- Keeping up to date with the developments in Maths and cascading this information to colleagues
- Liaising with the delegated governor and reporting to the Curriculum Lead and Head teacher, through audits, action planning, subject discussions and staff meetings.



IMPLEMENTATION

Approaches to learning

At Overton St. Helen's, children study mathematics daily covering a broad and balanced mathematical curriculum including elements of number, calculation, geometry, measures and statistics. Alongside daily maths sessions we use online resources to build fluency and precision. Due to the interconnected nature of mathematics, at Overton St. Helen's we aim to find cross-curricular links as well as discrete teaching to impart the practical application of mathematical skills. We focus not only on the mathematical methods but also on mathematical vocabulary and apply Maths Mastery to broaden and deepen mathematical understanding, revisiting basic computational skills through different topics.

We aim for each child to be confident in each yearly objective and develop their ability to use this knowledge to develop a greater depth understanding to solve varied fluency problems as well as problem solving and reasoning questions. We use textbooks and online resources throughout the school to ensure a curriculum that is specific to each child's learning needs. Children in Year 6 use various resources to complement their class and homework activities, which aims to consolidate mathematical knowledge.

From the 2019/20 academic year onwards, schools in England will be required to administer an online multiplication tables check (MTC) to year 4 pupils. The purpose of the MTC is to determine whether pupils can recall their times tables fluently, which is essential for future success in mathematics. It will help schools to identify pupils who have not yet mastered their times tables, so that additional support can be provided. To support the children with their multiplication practice we use 'Times Table Rock Stars' as an online and fun learning platform which also offer resources to be used in the classroom.

Planning

Teachers plan and deliver lessons that suit the individual learning styles of the children within the group. They use their professional judgement and use of formative assessment to ensure a flexible approach is adopted which recognises the need for pace of learning within the classroom. Children are given the opportunity to engage in fluency, reasoning and problem-solving activities daily to demonstrate their understanding.

In Key Stage 1, each year group has a long-term plan to show the progression of units across the year. In Key Stage Two, there are termly overview sheets that are designed to be mixed-aged and cross in the following way: Willow Class has mixed-year three/four overview; Beech Class has a mixed-year four/five overview and Oak Class has a mixed-year five/six overview.

For medium-term plans, each block shows a clear progression of 'small steps' for teachers to build their planning on. These 'small steps' outline the sequence of learning needed for each unit for children to attain 'mastery'. In Key Stage 2, the medium-term plans align the relevant objectives from adjacent year groups so that all children access the objectives relevant to their educational journey; teachers then use these to create their weekly plans. Now, we are in a split transitional phase to avoid gaps in learning and ensure that children receive the full curriculum.

Resources

A bank of essential mathematics resources including Numicon and Base 10 equipment is kept within classrooms for teachers and children to access within their lessons. These resources are progressive and become more standardised from Year 2 onwards, as laid out in the calculation policy. Further resources are kept in Sycamore Room. These resources are reviewed yearly, were old equipment is replaced and new and up-to-date resources are bought.

Equal Opportunities

In line with the School's Inclusion Policy, each child has an equal entitlement to all aspects of the Maths curriculum and to experience the full range of Maths activities. Therefore, in delivering Maths, care will be taken to ensure that all learning needs are met (for example, books with coloured pages) to ensure all children keep up. Intervention groups will take place both within the Maths lesson and outside of it to address any catch up need. These sessions may be delivered by the teacher or learning support assistant and may involve individual or small group work and may include extending the ablest mathematicians as well as supporting learners who require additional practise of skills.

Working Walls

Each classroom / resource area should have a maths display relating to current work. The maths display should be updated regularly to reflect the pace of learning. Displays can include: key vocabulary, children's work, teacher modelling, visual prompts and questions to develop reasoning skills.

IMPACT

Success Criteria

EYFS (changed its position in the policy)

In Early Years, Mathematics involves providing children with opportunities to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems; and to describe shapes, spaces, and measure.

Pupils are taught to:

Number
count reliably with numbers from 1 to 20
place them in order and say which number is one more or one less than a given number
add and subtract two single-digit numbers and count on or back to find the answer using quantities and objects
solve problems, including doubling, halving and sharing

Shape, space and measure
use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems
recognise, create and describe patterns
explore characteristics of everyday objects and shapes

use mathematical language to describe them.

Key Stage 1

The National Curriculum (2014) states that:

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

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

By the end of Year Two, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at Key Stage One.

Lower Key Stage 2

The National Curriculum (2014) states that:

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

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of Year Four, pupils should have memorised their multiplication tables up to and including the 12-multiplication table and show precision and fluency in their work.

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

Upper Key Stage 2

The National Curriculum (2014) states that:

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

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

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

Pupils should read, spell and pronounce mathematical vocabulary correctly.

Assessment and Record Keeping

We recognise that AfL lies at the heart of promoting learning and in raising standards of attainment. We further recognise that effective AfL depends crucially on actually using the information gained.

The assessment procedures within maths include:

- Making ongoing assessments and responding appropriately to pupils during 'day-to-day' teaching. These 'immediate' responses are mainly verbal, but teachers will provide relevant feedback through marking that progresses the children's mathematical understanding.
- Adjusting planning and teaching within units in response to pupil's performance;
- The use of a variety of questions to check depth of understanding.
- Use information gained from statutory and optional tests. Analysis is done at both a quantitative and qualitative level. Information gained is used to set teaching priorities.

Assessment is carried out:

- Orally through questioning
- By observation of children at work
- Marking of children's work
- Through planned assessment activities linked to the key objectives
- Informal assessment takes place continuously
- Optional termly tests are used in Years 3, 4 and 5
- Teachers make and record an end-of-term assessment for each child.

Reporting to Parents

It is important that parents and carers are actively involved in the children's education. In order to help keep them informed, parents and carers are always welcome to make an appointment with their child's teacher.

We report achievement to parents through a detailed yearly report and parents are offered appointments to attend three parent-teacher consultations yearly.

Date of policy: Feb 2020

Next review date: Feb 2022

Appendix: Progression in skills and knowledge

Appendix 1 – Long term plan for each year group

WRM – Year 1 – Scheme of Learning 2.0s

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value (within 10)				Number: Addition and Subtraction (within 10)				Geometry: Shape	Number: Place Value (within 20)		Consolidation
Spring	Number: Addition and Subtraction (within 20)				Number: Place Value (within 50) (Multiples of 2, 5 and 10 included)			Measurement: Length and Height		Measurement: Weight and Volume		Consolidation
Summer	Number: Multiplication and Division (Reinforce multiples of 2, 5 and 10 to be included)			Number: Fractions		Geometry: Position and Direction	Number: Place Value (within 100)		Measurement: Money	Measurement: Time		Consolidation

WRM – Year 2 – Scheme of Learning 2.0s

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value			Number: Addition and Subtraction					Measurement: Money		Number: Multiplication and Division	
Spring	Number: Multiplication and Division		Statistics		Geometry: Properties of Shape			Number: Fractions			Measurement: Length and Height	Consolidation
Summer	Geometry: Position and Direction			Problem solving and efficient methods		Measurement: Time		Measurement: Mass, Capacity and Temperature			Investigations	

WRM – Year 3/4 – Scheme of Learning 2.0s

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value				Number: Addition and Subtraction				Number: Multiplication and Division			
Spring	Number: Multiplication and Division		Measurement: Length, Perimeter and Area		Number: Fractions				Y3: Measurement: Mass and Capacity Y4: Number: Decimals			Consolidation
Summer	Number: Decimals (including Money)			Measurement: Time	Statistics			Geometry: Properties of Shape (including Y4 Position and Direction)				Consolidation

WRM – Year 4/5 – Scheme of Learning 2.0s

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value				Number: Addition and Subtraction			Number: Multiplication and Division			Measurement: Length, Perimeter and Area	
Spring	Number: Multiplication and Division			Number: Fractions				Number: Decimals (including Y5 Percentages)				
Summer	Number: Decimals (including Y4 Money)		Measurement: Time	Statistics		Geometry: Properties of Shape		Geometry: Position and Direction	Y4: Consolidation Y5: Converting Units & Volume			Consolidation

<table>
<tr><th></th><th>Week 1</th><th>Week 2</th><th>Week 3</th><th>Week 4</th><th>Week 5</th><th>Week 6</th><th>Week 7</th><th>Week 8</th><th>Week 9</th><th>Week 10</th><th>Week 11</th><th>Week 12</th></tr>
<tr><td>Autumn</td><td colspan="2">Number: Place Value</td><td colspan="4">Number: Four Operations</td><td colspan="6">Number: Fractions</td></tr>
<tr><td>Spring</td><td colspan="3">Number: Decimals and Percentages</td><td colspan="2">Y5: Number: Decimals
Y6: Number: Algebra</td><td>Measurement: Converting Units</td><td colspan="2">Measurement: Perimeter, Area and Volume</td><td colspan="2">Y5: Consolidation
Y6: Number: Ratio</td><td colspan="2">Statistics</td></tr>
<tr><td>Summer</td><td colspan="2">Geometry: Properties of Shape</td><td>Geometry: Position and Direction</td><td colspan="2">Y6: SATS</td><td colspan="6">Investigations and Consolidation</td></tr>
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Appendix 2 – Mental Calculation Skill Progression with highlighted non-negotiables (per class, not year group)

Key Learning in Mathematics – Maple

Number – counting

Rote counting

- *Rote count from 1*
- *Rote count on from a given number between 1 and 20*
- *Rote count back from 20 to 1*
- *Rote count back from a given number between 1 and 20*
- *Know what number comes before or after a given number*
- *Say a number between two given numbers*

Counting objects

- *Understand that counting is to find out how many*
- *Use one to one correspondence when counting*
- *Understand the last number said is the number in the set*
- *Count up to 20 objects, pictures, sounds and actions*
- *Understand and use conservation of number*
- *Use the word 'zero' to represent 'none'*
- *Compare two sets of different objects saying which set is more, fewer, same, equal*
- *Order three or more sets of objects*
- *State without counting (subitise) quantities within 5*
- *Make a sensible guess of quantities within 10*

Count reliably with numbers from 1 to 20.

Number – calculating

- *Understand the concept of addition by practically combining sets of objects to find how many and use the terminology part – part – whole*
- *Understand the concept of subtraction by practically removing one amount from within another to find how many are left and use the terminology part – part – whole*
- *Relate subtraction to addition in practical situations using the terminology part – part – whole*
- *Identify one more and one less than a given number*
- *Identify two more and two less than a given number*
- *Add two single-digit numbers totalling up to 10, using practical equipment*
- *Add two single-digit numbers totalling greater than 10, using practical equipment*
- *Subtract a single-digit number from a number up to 10, using practical equipment.*
- *Subtract a single-digit number from a number greater than 10, using practical equipment*

Say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems involving doubling, halving and sharing.

Number – fractions

- *Understand that sharing is splitting an amount into equal parts*
- *Understand that halving is sharing into two equal parts*
- *Understand that doubling is adding the same number to itself*

They solve problems, including doubling, halving and sharing.

Number – number sense

- *Partition a set of objects in different ways using the terminology part - part - whole*
- *Understand that 'teen' numbers are a group of 10 plus another number*
- *Understand 20 is the same as two groups of 10*
- *Recognise repeating patterns in the counting sequence i.e. 6, 7, 8, 9 and 16, 17, 18, 19*

Number – number recognition

- *Recognise and identify numerals 0 to 20*
- *Select the numeral that represents a set of objects*
- *Order numerals 0 to 20*

Count reliably with numbers from 1 to 20, place them in order.

Number – graphics

- *Represent amounts in their own ways, explaining what they mean*
- *Represent and explain their thinking in their own ways*
- *Write numerals 0 to 20*

Shape

- *Use everyday language to talk about shapes in the environment*
- *Know that shapes can appear in different ways and be different sizes*
- *Build and make models with 3-D shapes*
- *Create patterns and pictures with 2-D shapes*
- *Name common 2-D shapes (circle, triangle, square, rectangle, oblong)*
- *Name common 3-D shapes (sphere, cube, cuboid, cone)*
- *Talk about shapes using mathematical language (straight, curved, sides, flat, solid)*
- *Sort shapes according to their own criteria*

Explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Space

- *Understand and use positional language in everyday situations*
- *Understand and use ordinal numbers when describing position*
- *Understand and use the language of movement/direction*
- *Describe and recognise patterns made of objects, numbers and shapes*
- *Create patterns made of objects, numbers and shapes*

Use everyday language to talk about position. They recognise, create and describe patterns.

Statistics

- *Sort objects and say what features they have in common*

Measurement

Distance

- *Understand that measures of distance can have different names including length, width, height*
- *Understand and use language to compare two objects of different length/width, e.g. longer / shorter; wider / narrower*
- *Understand and use language to compare two objects of different height, e.g. taller / shorter*
- *Understand and use language of comparison when ordering three objects of different lengths/widths/heights, e.g. longest / shortest; widest / narrowest; tallest / shortest*
- *Find an object of similar length/width/height*
- *Understand the concept of the conservation of length/width/height*
- *Use uniform non-standard units to measure length/width/height*

Weight

- *Understand the measurement of weight (heavy/light)*
- *Understand and use language to compare two objects of different weight, e.g. heavier/lighter*
- *Understand the concept of conservation of weight*
- *Use uniform non-standard units to measure weight*

Volume/capacity

- *Understand the measurement of volume/capacity (empty/full/nearly)*
- *Understand and use language to compare two of the same container holding different amounts, e.g. more/less*
- *Understand and use the language of comparison when ordering three of the same container holding different amounts, e.g. most/least*
- *Understand the concept of the conservation of volume/capacity*
- *Use uniform non-standard units to measure volume/capacity*

Money

- *Understand that we need to pay for goods*
- *Talk about things they want to spend their money on*
- *Talk about different ways we can pay for things*
- *Recognise that there are different coins*
- *Recognise 1p coin*
- *Use 1p coins to pay for objects*

Time

- *Talk about significant times of the day, e.g. home time, lunch time, snack time, bed time, etc.*
- *Understand and use language – before, after, yesterday, today, tomorrow*
- *Use the language of comparison when talking about time, e.g. longer/ shorter; faster/slower*
- *Sequence two or three familiar events and describe the sequence*
- *Know the names of the days of the week*
- *Say the names of the days of the week in order*

Use everyday language to talk about size, weight, capacity, distance, time and money to compare quantities and objects and to solve problems.

Holly Arithmetic Expectations – (Skills needed to help secure fluency in later years).

Skills	Examples
Counting	
Count in multiples of 2, 5 and 10.	Count from 0 in twos What number would come next in this counting sequence? 0, 5, 10, 15, 20, __ What number is missing from this counting sequence? 0, 10, 20, 40, 50
Recognise even and odd numbers when counting in twos from 0 or 1.	Continue this count: 2, 4, 6, 8, 10, 12, 14… Are these even numbers or odd? How do you know? Continue this count: 1, 3, 5, 7, 9, 11, 13… Are these even numbers or odd? How do you know? Which are the even numbers in this set? 5 16 22 47 32
Number Facts	
Recall number bonds and related subtraction facts for all numbers to 10.	6 + 4 = __ 2 + __ = 10 10 = __ + 5 10 – 3 = __ 10 – __ = 1 7 = 10 – __ 3 + 4 = __ 5 + __ = 7 7 = __ + 6 7 – 2 = __ 7 – __ = 3 5 = 7 – __
Recall doubles of all numbers to 10 and corresponding halves.	3 + 3 = __ double 6 is ___ half of 14 is ___ halve 8 double ___ is 10
Mental Calculation Strategies – Addition and Subtraction	
Count on or back in ones (chain count and link to objects, i.e. 1-1 correspondence). *Concrete – counters, beadstring, cubes on a number track* *Pictorial – number line*	4 + 5 count on in ones from 4 (or in ones from 5) 8 – 3 count back in ones from 8 10 + 7 count on in ones from 10 (or use place value) 13 + 5 count on in ones from 13 17 – 3 count back in ones from 17
Reorder numbers in a calculation. *Concrete – counters, counters in a ten frame*	8 + 3 doesn't need reordering as the greater number is first already 2 + 7 reorder as 7 + 2 5 + 13 reorder as 13 + 5 11 + 6 doesn't need reordering as the greater number is first already
Partition small numbers, e.g. 8 + 3 = 8 + 2 + 1 and 11 – 3 = 11 – 1 – 2 *Concrete – counters in a ten frame, beadstring* *Pictorial – number line*	7 + 5 partitioned as 7 + 3 + 2 9 + 7 partitioned as 9 + 1 + 6 6 + 8 partitioned as 6 + 4 + 4 or reordered and partitioned as 8 + 2 + 4 12 – 5 partitioned as 12 – 2 – 3 14 – 8 partitioned as 14 – 4 – 4
Mental Calculation Strategies – Multiplication and Division	
Apply counting in twos, fives and tens to solve multiplication problems with a repeated addition context. *Concrete – real items to model the context of the problem* *Pictorial – images of the items in the context of the problem*	How much money is the total of six 5p coins? How many fingers would seven children have altogether? How many boots are lined up after five children take them off?
Share an amount into equal parts. *Concrete – real items to model the context of the problem* *Pictorial – images of the items in the context of the problem*	A bunch of 20 grapes are shared equally between two children? How many grapes do they each get? Five children are given £50 to share equally by their grandma. How much money do they each get?

Elm Arithmetic Expectations – (Skills needed to help secure fluency in later years).

Skills	Examples
Counting	
Count in multiples of 2, 3 and 5 from 0. **(*Counting in 2s and 5s from 0 is continuation of Year 1 expectations*).**	Count from 0 in: twos; fives; threes. Complete these counting sequences: 0, 5, 10, 15, 20, __, __, __ 0, 2, 4, 6, 8, __, __, __ 0, 3, 6, 9, __, __, __ What number is missing from this counting sequence? 0, 3, 6, 9, 12, 15, 18, 24, 27
Count forwards or backwards in steps of 1 or 10 from any one- or two-digit number	Count forwards in ones from 75 to 92 Count back in ones from 54 to 38 Continue these sequences: 24, 34, 44, __, __, __ 89, 79, 69, __, __, __ 44, 34, 24, __, __
Count on and back in steps of $\frac{1}{2}$ and $\frac{1}{4}$	Count from 0 in steps of $\frac{1}{2}$ When counting from 0 in steps of $\frac{1}{4}$ what comes immediately after $\frac{3}{4}$? *Answer could be $\frac{4}{4}$ or 1* Count back in steps of $\frac{1}{2}$ from $\frac{6}{2}$ Count back in steps of $\frac{1}{2}$ from $2\frac{1}{2}$
Number Facts	
Recall number bonds and related subtraction facts for all numbers to 20	16 + 4 =__ 2 +__= 20 20 =__+ 5 20 – 13 =__ 20 –__= 1 6 = 20 –__ 3 + 14 =__ 5 +__= 14 14 =__+ 6 14 – 2 =__ 14 –__= 3 5 = 14 –__
Derive and use related facts to 100	60 + 40 =__ 70 +__=100 100 = 20 +__ 100 – 40 =__ 100 –__= 70 20 = 100 –__
Partition numbers into tens and ones.	46 is 40 and 6 46 is 40 and__ 46 is 6 and __ 40 +__= 46 6 + 40 =__
Recall and use number bonds to 5 totalling 60 (to support time).	40 + 20 =__ 25 +__= 60 60 =__ + 15 60 – 10 =__ 60 –__ = 30 35 = 60 –__
Recall and use multiplication and division facts for 2, 5 and 10 multiplication tables, including recognising odd and even numbers.	6 x 2 =__ 2 x__= 16 __x 5 = 15 __= 5 x 7 110 ÷ 10 =__ __= 80 ÷ 10 Which of these numbers are odd? 32, 44, 18, 40, 55, 23, 100
Mental Calculation Strategies – Addition and Subtraction	
Count on or back in ones and tens from any given number, e.g. (36 + 40 =) *Concrete – Diennes equipment, place value counters, beadstring* *Pictorial – Diennes jottings, number line*	36 + 40 = __ 30 + 48 = __ 89 – 50 = __ 76 – __ = 46
Partition and combine multiples of tens and ones. *Concrete – Diennes equipment, place value counters, beadstring* *Pictorial – Diennes jottings, number line*	40 + 37 40 add **30** and **7** = 40 add 30 add 7 15 + 14 **10** and **5** add **10** and **4** = 10 add 10 add 5 add 4 or 15 add 10 add 4 37 + 12 37 add **10** and **2** = 37 add 10 add 2 78 – 42 78 take away **40** and **2** = 78 take away 40 take away 2 80 – 35 80 take away **30** and **5** = 80 take away 30 take away 5

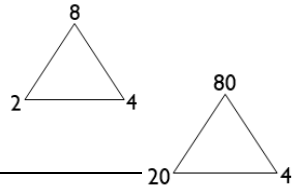
Reorder numbers in a calculation.	28 + 3 doesn't need reordering as the greater number is first already

Concrete – Diennes equipment, place value counters, beadstring *Pictorial – Diennes jottings, number line*	2 + 17 reorder as 17 + 2 5 + 63 reorder as 63 + 5 16 – 8 will not give the same answer if reordered
Find a small difference by counting up from the lesser to the greater number *Concrete – Diennes equipment shown horizontally, beadstring* *Pictorial – Number line*	52 – 47 74 – 66 81 – 79 32 – 25
Begin to bridge through 10 when adding a single digit number (partitioning, e.g. 58 + 5 = 58 + 2 + 3) *Concrete – Diennes equipment, place value counters, beadstring* *Pictorial – number line*	58 + 5 = 58 + 2 = 60 60 + 3 = 63 63 + 8 = 63 + 7 = 70 70 + 1 = 71 46 + 7 = 46 + 4 = 50 50 + 3 = 53 48 + 7 = 48 + 2 = 50 50 + 5 = 55
Add or subtract 9 or 11 and 19 or 21 by rounding and compensating. *Concrete – Diennes equipment, place value counters* *Pictorial – number line, 100 square*	34 + 9 as 34 + 10 – 1 34 + 11 as 34 +10 + 1 77 + 19 as 77 + 20 – 1, or 77 + 10 + 10 – 1 46 – 9 as 46 – 10 + 1 46 – 11 as 46 – 10 – 1 63 – 19 as 63 – 20 + 1, or 63 – 10 – 10 + 1
Mental Calculation Strategies – Multiplication and Division	
Apply counting in twos, threes, fives and tens to solve multiplication problems with a repeated addition context. *Concrete – real items to model the context of the problem, Multilink arrays, beadstring* *Pictorial – images of the items in the context of the problem, jottings, arrays, number line*	5 x 4 count in fives until fact is known 3 x 10 count in tens until fact is known 7 x 3 using a representation then count in threes 2 x 9 count in twos until fact is known
Share an amount into equal parts. *Concrete – real items to model the context of the problem* *Pictorial – images of the items in the context of the problem*	24 ÷ 2 share out until fact is known 40 ÷ 10 share out until fact is known 18 ÷ 3 using a representation to share 18 into 3 equal parts
Separate an amount into equal groups using repeated subtraction. *Concrete – real items to model the context of the problem, Multilink arrays, beadstring* *Pictorial – images of the items in the context of the problem, arrays, jottings, number line*	24 ÷ 2 repeated subtraction until fact is known 40 ÷ 10 repeated subtraction until fact is known 18 ÷ 3 repeated subtraction to find how many 3s are in 18 I have 24 sweets. How many children would get 2 sweets? There are 30 bears who live on one street. Three bears live in every house. How many houses are on the street?
Derive and use doubles of simple two-digit numbers. (of which the ones total less than 10) *Concrete – Diennes equipment, place value counters* *Pictorial – Diennes jottings*	Double 43 is double 40 (80) plus double 3 (6) = 86 24 add 24 is double 20 (40) plus double 4 (8) = 48 2 x 33 (two lots of 33) is double 30 (60) plus double 3 (6) = 66
Derive and use halves of simple two-digit number even numbers. (of which the tens are even) *Concrete – Diennes equipment, place value counters* *Pictorial – Diennes jottings*	Half of 64 is half of 60 (30) plus half of 4 (2) = 32 Halve of 28 is half of 20 (10) plus half of 8 (4) = 14 46 ÷ 2 is half of 40 (20) plus half of 6 (3) = 23

Willow Arithmetic Expectations – (Skills needed to help secure fluency in later years).

Skills	Examples
Counting	
Find 1, 10 or 100 more or less than a given number. **As well as 0.1 and 1000 more than a given number.**	229 + 1 = __ 229 + 10 = __ 229 + 100 = __ 200 = __ + 1 479 + __ = 480 726 + __ = 826 400 – 1 = __ 261 – 10 = __ __ = 812 – 100
Count from 0 in multiples of 4, 8, 50 and 100 **Count in multiples of 6, 7, 9, 25 and 100.**	Count from 0 in fours Count from 0 in eights What number is missing from this counting sequence? 0, 8, 16, 32, 40, 48 What number would come next in this counting sequence? 0, 50, 100, 150, 200, __ What number comes immediately after 600 when counting up in steps of 100?
Count up and down in tenths.	Count on from 0 in tenths. What would come next in this counting sequence? 0, $\frac{1}{10}$, $\frac{2}{10}$, $\frac{3}{10}$, $\frac{4}{10}$ What is missing from this number sequence? $\frac{7}{10}$, $\frac{6}{10}$, $\frac{5}{10}$, $\frac{3}{10}$, $\frac{2}{10}$
Number Facts	
Recall addition and subtraction facts for 100 (multiples of 5 and 10). **Recall and use addition and subtraction facts for multiples of 100 totalling 1000.**	100 – 30 = __ 20 + __ = 100 100 = __ + 5 100 – 45 = __ 100 – __ = 15 65 = 100 – __
Recall and use multiplication division facts up to 12 x 12	6 x 3 = __ 2 x 4 = __ 4 x 8 = __ 20 = 4 x __ 21 = 3 x __ 32 = __ x 8 __ x 4 = 28 30 ÷ 3 = __ 24 ÷ 4 = __ 72 ÷ 8 = __ 3 = 36 ÷ __ __ = 32 ÷ 4 __ = 48 ÷ 6
Mental Calculation Strategies - Addition and Subtraction	
Identify and use knowledge of number bonds within a calculation. *Concrete – tens frames, Diennes equipment, place value counters* *Pictorial – Diennes jottings, number line*	42 + 38 42 + 30 + 8 (recognising that 2 and 8 is a number bond to 10, so the answer will be a multiple of 10) 60 – 28 60 – 20 – 8 (using knowledge that 10 – 8 = 2, so 40 – 8 = 32) 120 – 50 120 – 20 – 30 (using knowledge of number bonds to 100, leaving an answer of 70)
Derive and use addition and subtraction facts for 100 *Concrete – Diennes equipment, place value counters, beadstring* *Pictorial – Number line*	100 – 43 = __ 22 + __ = 100 100 = __ + 9 100 – 76 = __ 100 – __ = 48 66 = 100 – __
Derive and use addition and subtraction facts for multiples of 100 that total 1000 *Concrete – Diennes equipment, place value counters* *Pictorial – Diennes jottings*	1000 – 300 = __ 200 + __ = 1000 1000 = __ + 500 1000 – 400 = __ 1000 – __ = 100 600 = 1000 – __
Reorder numbers in a calculation. *Concrete – tens frames, Diennes equipment, place value counters* *Pictorial – Diennes jottings, number line*	23 + 54 54 + 23 12 + 19 + 12 12 + 12 + 19 (using knowledge of doubles) 6 + 8 + 4 6 + 4 + 8 (using knowledge of number bonds to 10) 70 + 50 + 30 70 + 30 + 50 (using knowledge of number bonds to 100)
Partition and combine multiples of hundreds, tens and ones. *Concrete – Diennes equipment, place value counters, beadstring* *Pictorial – number line*	526 + 200 counting on in hundreds 137 + 40 counting on in tens 272 + 8 counting on in ones (or using knowledge of bonds to 10) 428 – 200 counting back in hundreds 323 – 70 counting back in tens

	693 – 8 counting back in ones 37 + 15 37 add 10 and 5 = 37 add 10 add 5 (crossing tens boundaries) 42 – 25 42 take away 20 and 5 = 42 take away 20 take away 5 (crossing tens boundaries)
Find differences by counting up through the next multiple of 10 or 100 *Pictorial - number line*	60 – 43 useful for time calculations, e.g. a journey time from 2:43 until 3:00 53 – 38 efficient because the numbers are close to each other 104 – 95 efficient because the numbers are close to each other 200 – 86 useful for money calculations, e.g. change from £2 when spending 86p
Bridge through 10 when adding or subtracting a single digit number (partitioning, e.g. 58 + 5 = 58 + 2 + 3 or 76 – 8 = 76 – 6 – 2) *Pictorial - number line*	35 + 7 as 35 + 5 + 2 97 + 6 as 97 + 3 + 3 178 + 5 as 178 + 2 + 3 42 – 7 as 42 – 2 – 5 204 – 6 as 204 – 4 – 2 371 – 5 as 371 – 1 – 4
Add or subtract 9, 19, 29 etc by rounding and compensating *Pictorial - number line*	34 + 29 as 34 + 30 – 1 127 + 49 as 127 + 50 – 1 96 – 39 as 96 – 40 + 1 273 – 59 as 273 – 60 + 1
Identify and use knowledge of number bonds within a calculation and identify related facts, e.g. 150 + 270 from 15 + 27 *Concrete – Diennes equipment, place value counters* *Pictorial – Diennes jottings*	120 + 80 using knowledge of 12 + 8 = 20 250 + 130 using knowledge of 25 + 13 = 38 200 – 70 using knowledge of 20 – 7 = 13 460 – 150 using knowledge of 46 – 15 = 31
Mental Calculation Strategies – Multiplication and Division	
Derive and use doubles of all numbers to 100 and corresponding halves. *Concrete - Diennes equipment, place value counters* *Pictorial – part – part – whole diagram*	Double 46 Halve 86 29 + 29 Find half of 54 38 x 2 92 ÷ 2
Derive and use doubles of all multiples of 50 to 500 *Concrete - Diennes equipment, place value counters* *Pictorial – part – part – whole diagram*	Double 350 400 + 400 450 x 2
ultiply a one- or two-digit numbers by 10 and by 100 (whole numbers only) *oncrete - Diennes equipment, place value counters* *Pictorial - place value chart*	3 x 10 7 x 100 62 x 10
Within known tables, use related facts to multiply T0 by a one-digit number NB T0 represents a two-digit multiple of ten. *Concrete – Diennes equipment, place value counters* *Pictorial – Diennes jottings*	60 x 3 related to 6x3 because 60 x 3 = 10 x 6 x 3 which can be reordered to 6 x 3 x 10 50 x 4 related to 5 x 4 because 50 x 4 = 10 x 5 x 4 which can be reordered to 5 x 4 x 10 30 x 8 related to 3 x 8 because 30 x 8 = 10 x 3 x 8 which can be reordered to 3 x 8 x 10
Within known tables, use partitioning to multiply T1 by a one-digit number *Pictorial - Show array using squared paper.*	31 x 4 = 30 x 4 add 1 x 4 (said as '*thirty fours add one four*') 31 x 4 = 120 + 4 31 x 4 = 124

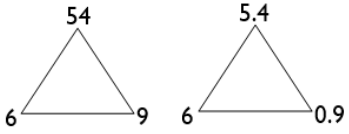
	61 x 4 31 x 8
Use compensation to multiply 19 by a one-digit number *Pictorial - Show array using squared paper.*	19 x 4 = 20 x 4 subtract 1 x 4 (said as '*twenty fours subtract one four*') 19 x 4 = 80 – 4 19 x 4 = 76 19 x 3 19 x 5 19 x 8
Use partitioning to double any two-digit number *Concrete – Diennes equipment, place value counters* *Pictorial – Diennes jottings, part-part-whole diagram to double e.g. double 76*	Double 39, double 52, double 85
Use related facts or partitioning to double any multiple of 50 to 500 *Concrete – Diennes equipment, place value counters* *Pictorial – Diennes jottings, part-part-whole diagram to double e.g. double 350*	Double 250, double 450, double 150
Use related facts to divide T0 by a one-digit number NB T0 represents a multiple of ten *Concrete – Diennes equipment, place value counters* *Pictorial – Diennes jottings, division trio e.g. 8 ÷ 2 = 4 then* *80 ÷ 20 = 4* 	60 ÷ 3 related to 6 ÷ 3 80 ÷ 40 related to 8 ÷ 4 90 ÷ 3 related to 9 ÷ 3
Use partitioning to halve even numbers up to 200 *Concrete – Diennes equipment, place value counters* *Pictorial – Diennes jottings, part-part-whole diagram to halve e.g. halve 154*	Find half of 162 by partitioning into 160 and 2 Find half of 94 by partitioning into 80 and 14 Find half of 136 by partitioning into 120 and 16
Use partitioning to divide TU by a one-digit number. *Concrete – Diennes equipment, place value counters* *Pictorial – part-part-whole diagram*	68 ÷ 4 by partitioning into 40 and 28 (both multiples of 4) 95 ÷ 5 by partitioning into 50 and 45 (both multiples of 5) 84 ÷ 6 by partitioning into 60 and 24 (both multiples of 6)

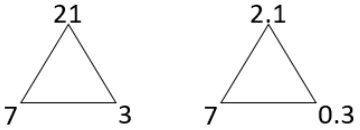
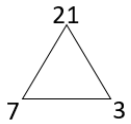
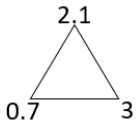
Beach Arithmetic Expectations – (Skills needed to help secure fluency in later years).

Skills	Examples
Counting	
Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000. **Including 0.1, 0.01**	Count on from 34 642 in hundreds. What four numbers would come next in this counting sequence? 422 734, 412 734…
Count forwards or backwards in decimal steps.	Continue this count: 4.4, 3.8, 3.2,… What four numbers would come next in this counting sequence? 2.16, 2.27, 3.38…
Find 0.01, 0.1, 1, 10, 100, 1000 and other powers of 10 more or less than a given number.	154 041 – 100 474 985 + 1 000 202 883 – 10 000 23.47 + 0.1 6.07 – 0.1 31.09 + 0.01 12.3 – 0.01
Count backwards through zero to include negative numbers.	What number would come next in this counting sequence? 5, 0, -5, -10,
Number Facts	
Recall addition and subtraction facts for 1 and 10 (with numbers to one decimal place).	0.6 + 0.4 = __ 0.2 + __ = 1 1 = __ + 0.5 1 – 0.3 = __ 1 – __ = 0.1 0.7 = 1 – __ 1.3 + 8.7 = __ 2.5 + __ = 10 10 = __ + 4.6 10 – 5.2 = __ 10 – __ = 6.3 1.9 = 10 – __
Recall related tables facts for multiples of 10	70 x 6 8 x 40 90 x 6
Recall square (^{2}) numbers up to 12 x 12	Instantly know the square of all numbers to 12: $1^2 = 1$, $2^2 = 4$, $3^2 = 9$, $4^2 = 16$, $5^2 = 25$, $6^2 = 36$, $7^2 = 49$, $8^2 = 64$, $9^2 = 81$, $10^2 = 100$, $11^2 = 121$ and $12^2 = 144$
Multiplying by 0 and 1	354 x 1 = ___ 803 x __ = 803 1734 = 1 x _____ 354 x 0 = ___ 803 x __ = 0 0 = 0 x _____
Dividing by 1	542 ÷ 1 = ___ 607 = 607 ÷ __ 38 = ___ ÷ 1
Recognise and use factor pairs and commutativity in mental calculations.	60 x 3 = 6 x 10 x 3 reordered to give 6 x 3 x 10 = 180 14 x 4 = 7 x 2 x 4 with order of calculations being 7 x (2 x 4) = 56
Mental Calculation Strategies – Addition and Subtraction	

Derive and use addition and subtraction facts for 1 and 10 (with decimal numbers to one decimal place) ***and when the children are ready…*** **Derive and use addition and subtraction facts for 1 (with decimal numbers to two decimal places)** *Concrete – (if necessary) place value counters* *Pictorial – number line*	0.5 + __ = 1 __ + 0.7 = 1 1 = 0.3 + __ 1 = __ + 0.8 1 – 0.8 = __ 1 – __ = 0.6 0.4 = 1 – __ __ = 1 – 0.9 0.45 + __ = 1 __ + 0.27 = 1 1 = 0.39 + __ 1 = __ + 0.78 1 – 0.08 = __ 1 – __ = 0.61 0.54 = 1 – __ __ = 1 – 0.89	2.3 + __ = 10 __ + 8.2 = 10 10 = 5.6 + __ 10 = __ + 2.2 10 – 6.1 = __ 10 – __ = 4.9 2.8 = 10 – __ __ = 10 – 6.7
Partition and combine multiples of thousands hundreds, tens and ones. *Concrete (if necessary) – place value counters* *Pictorial – number line*	4300 + 1400 364 + 250 3600 – 1200 432 – 240 5124 + 1352 7584 – 2351	4300 **add 1000** = 5300 then **add 400** = 5700 364 **add 200** = 564 then **add 50** = 614 3600 **subtract 1000** = 2600 then **subtract 200** = 2400 432 **subtract 200** = 232 then **subtract 40** = 192 5124 **add 1000** = 6124 then **add 300** = 6424 then **add 50** = 6474 then **add 2** = 6476 (not crossing any boundaries) 7584 **subtract 2000** = 5584 then **subtract 300** = 5284 then **subtract 50** = 5234 then **subtract 1** = 5233 (not crossing any boundaries)
Partition and combine multiples of ones and tenths. *Concrete (if necessary) – place value counters* *Pictorial – number line*	5.4 + 3.2 4.7 – 2.5	5.4 **add 3** = 7.4 then **add 0.2** = 7.6 4.7 **subtract 2** = 2.7 then **subtract 0.5** = 2.2
Identify and use knowledge of number bonds within a calculation and identify related facts, e.g. 1.5 + 2.7 from 15 + 27 *Concrete (if necessary) – place value counters*	1.2 + 0.8 2.5 + 1.3 3.8 + 4.5 2 – 0.7 4.6 – 1.5 8.3 – 5.4	using knowledge of 12 + 8 = 20 using knowledge of 25 + 13 = 38 using knowledge of 38 + 45 = 83 using knowledge of 20 – 7 = 13 using knowledge of 46 – 15 = 31 using knowledge of 83 – 54 = 29
Bridge through 10 when adding or subtracting a single digit number (partitioning, e.g. 58 + 5 = 58 + 2 + 3 or 76 – 8 = 76 – 6 – 2) *Concrete (if necessary) – Diennes equipment, place value counters* *Pictorial – number line*	594 + 170 1995 + 278 703 – 128 3002 – 87	as 594 + 6 + 164 = 600 + 164 as 1995 + 5 + 273 = 2000 + 273 as 703 – 3 – 125 = 700 – 125 as 3002 – 2 – 85 = 3000 – 85

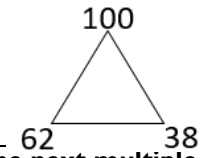
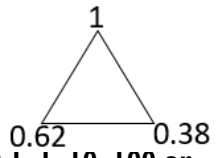
Find differences by counting up through the next multiple of 1, 10, 100 or 1000 *Concrete (if necessary) – place value counters* *Pictorial – number line*	604 – 289 289 **+ 11** = 300 **+ 300** = 600 **+ 4** = 604 so the difference is **315** 523 – 160 160 **+ 40** = 200 **+ 300** = 500 **+ 23** = 523 so the difference is **363** 1200 – 785 785 **+ 15** = 800 **+ 400** = 1200 so the difference is **415** 5003 – 1960 1960 **+ 40** = 2000 **+ 3003** = 5003 so the difference is **3043** 7.3 – 2.8 2.8 **+ 0.2** = 3 **+ 4** = 7 **+ 0.3** = 7.3 so the difference is **4.5** 20.1 – 6.7 6.7 **+ 3.3** = 10 **+ 10.1** = 20.1 so the difference is **13.4**
Add or subtract a multiple of 10 and adjust (for those numbers close to multiples of 10) *Concrete (if necessary) – Diennes equipment, place value counters* *Pictorial – number line*	257 + 68 as 257 + 70 – 2 = 327 – 2 325 + 298 as 325 + 300 – 2 = 625 – 2 764 – 88 as 764 – 90 + 2 = 674 + 2 876 – 397 as 876 – 400 + 3 = 476 + 3
Mental Calculation Strategies – Multiplication and Division	
Multiply/divide whole numbers and decimals by 10, 100 and 1000 *Concrete (if necessary) – Diennes equipment, place value counters* *Pictorial – place value chart*	75.91 x 10 874 ÷ 10 5.07 x 10 60.1 ÷ 10 670.4 x 100 7043 ÷ 100 360 x 1000 48 750 ÷ 1000 0.76 x 1000

Use related facts to multiply H00 / Th000 by a one-digit number and divide a H00 / ThH00 by a one-digit number *Pictorial – place value chart for multiplying/dividing by 1000,* *related facts multiplication trio and related facts division trio* 	3000 x 3 related to 3 x 3 = 9 *This should be understood as 'three thousand threes'.* *As the number of 3s is 1000x greater than three threes, so the product is 1000x greater.* 7000 x 5 8000 x 9 7200 ÷ 9 related to 72 ÷ 9 *This should be understood as 'how many nines in 7200? Compared to how many nines in 72?'* *As the dividend is 100x greater, then the number of nines in it will be 100x greater.* 3000 ÷ 6 9600 ÷ 8
Use related facts to multiply 0.t by a one-digit number *Pictorial – related facts multiplication trio* 	0.3 x 7 related 3 x 7 = 21 *The number of 7s is 10x less, so the product will be 10x less.* 0.6 x 9 0.5 x 4
Use factor pairs to multiply T0 x T0 and T9 by a one-digit number. *Pictorial – place value chart for multiplying by 100*	30 x 60 becomes 3 x 10 x 6 x 10 reordered as 3 x 6 x 10 x 10 70 x 80 becomes 7 x 10 x 8 x 10 reordered as 7 x 8 x 10 x 10 50 x 40 becomes 5 x 10 x 4 x 10 reordered as 5 x 4 x 10 x 10

Use compensation to multiply T9 and H99 by a one-digit number NB H99 represents a three-digit number with 9 tens and 9 ones *Pictorial – rectangular array or a rectangle with given dimensions*	599 x 4 considered as 600 x 4 – 1 x 4 (read as '*six hundred fours subtract one four*') 399 x 6 considered as 400 x 6 – 1 x 6 (read as '*four hundred sixes subtract one six*') 699 x 9 considered as 700 x 9 – 1 x 9 (read as '*seven hundred nines subtract one nine*')
Use partitioning to multiply TU and U.t by a one-digit number *Pictorial – partitioning diagram using grid method strategy*	6.7 x 4 becomes **6** x 4 + **0.7** x 4 3.2 x 7 becomes **3** x 7 + **0.2** x 7 8.5 x 6 becomes **8** x 6 + 0.**5** x 6
Use partitioning to double or halve numbers including those with one decimal places *Concrete (if necessary) – place value counters* *Pictorial – partitioning diagram*	Double 56.7 Double 485.6
Use related facts to divide U.t by a one-digit number *Pictorial – place value chart, related facts division trio* *e.g. 21 ÷ 7 = 3 then 2.1 ÷ 7 = 0.3*  	2.1 ÷ 7 related to 21 ÷ 7 = 3 *This should be understood as 'how many sevens in 2.1? Compared to how many sevens in 21?'* *As the dividend is 10x smaller, then the number of sevens in it will be 10x smaller.* 3.6 ÷ 9 4.8 ÷ 4
Use related facts to divide U.t by one digit / 0.t *Pictorial – place value chart, related facts division trio* *e.g. 21 ÷ 7 = 3 then 2.1 ÷ 0.7 = 3*  	2.1 ÷ 0.7 related to 21 ÷ 7 = 3 *This should be understood as 'how many 0.7s in 2.1? Compared to how many sevens in 21?'* *As the dividend is 10x smaller and the divisor is 10x smaller, then the answer (quotient) will be the same.* 3.6 ÷ 0.9 4.8 ÷ 0.4
Use partitioning to double or halve any number, including decimals to one decimal place. *Concrete – place value counters* *Pictorial – partitioning diagram*	Double 374 Halve 468 Double 4524 Find half of 7602 Double 7.6 What is half of 8.2?
Use partitioning to divide HTU by a one-digit number *Concrete (if necessary) – Diennes equipment, place value counters* *Pictorial – part-part-whole diagram*	756 ÷ 9 By partitioning into 720 and 36 (two multiples of 9 totalling 756) 765 ÷ 5 By partitioning into 500 and 250 and 15 (three multiples of 5 totalling 765) 861 ÷ 7 By partitioning into 700 and 140 and 21 (three multiples of 7 totalling 861)
Use related facts to multiply TU x 5 (by multiplying by 10 and halving). *Concrete – Diennes equipment, place value counters* *Pictorial – place value chart and a part-part-whole diagram, rectangular arrays on squared paper*	28 x 5 becomes 28 x 10 = 280 then 280 ÷ 2 = 140 81 x 5 becomes 81 x 10 = 810 then 810 ÷ 2 = 405 54 x 5 becomes 54 x 10 = 540 then 540 ÷ 2 = 270
Use related facts to multiply TU x 20 (by multiplying by 10 and doubling). *Concrete – Diennes equipment, place value counters*	34 x 20 becomes 34 x 10 = 320 then 320 x 2 = 640 47 x 20 becomes 47 x 10 = 470 then 470 x 2 = 940 68 x 20 becomes 68 x 10 = 680 then 680 x 2 = 1360

Pictorial – place value chart and a part-part-whole diagram, rectangular arrays on squared paper	
Multiply together three numbers. *Concrete – rectangular arrays created with counters or cubes* *Pictorial – rectangular arrays on squared paper*	3 x 4 x 6 (read as '*three lots of four sixes*') 7 x 3 x 9 (read as '*seven lots of three nines*') 5 x 6 x 8 (read as '*five lots of six eights*')
Use place value, known and derived facts to divide mentally. *Concrete – Diennes equipment, place value counters* *Pictorial – place value chart*	120 ÷ 10 600 ÷ 100 850 ÷ 10

Oak Arithmetic Expectations – (Skills needed to help secure fluency in later years).

Skills	Examples
Counting	
Count forwards and backwards in steps of integers, decimals and powers of 10.	Count from 0 in steps for multiplication facts for up to 12x tables What number would come next in this counting sequence? 0, 10, 100, 1000, __, __ What number is missing from this counting sequence? 0, 0.01, 0.02, 0.04, 0.05
Find 0.001, 0.01, 0.1, 1 10 and powers of 10 more/less than a given number.	500 +/- 0.001 = 9.46 +/- 0.01 = What is 1000 more than _____? What is 0.1 less than _____?
Number Facts	
Recall and use addition and subtraction facts for 1 (with decimals to two decimal places)	1 = 0.05 + __ 0.95 + __ = 1 __ + 0.8 = 1 0.09 + __ = 1 0.23 + __ = 1 __ + 0.4 = 1
Multiply and divide numbers by 10, 100, 1000 giving answers up to three decimal places	345 x 10 = 4598 ÷ 10 = 452 ÷ __ = 4.52 894 x 100 = 2098 ÷ 100 = 109 x __ = 10900
Mental Calculation Strategies – Addition and Subtraction	
Partition and combine multiples of thousands hundreds, tens and ones *Concrete (if necessary) – place value counters* *Pictorial – number line*	5800 + 2400 5800 add 2000 and 400 = 5800 add 2000 add 400 873 + 350 873 add 300 and 50 = 873 add 300 add 50 4100 - 1600 4100 take away 1000 and 600 = 4100 take away 1000 take away 600 2132 - 440 2132 take away 400 and 40 = 2132 take away 400 take away 40 5124 + 1352 5124 add 1000 and 300 and 50 and 2 = 5124 add 1000 add 300 add 50 add 2 (crossing no boundaries) 7584 - 2351 7584 take away 2000 and 300 and 50 and 1 = 7584 take away 2000 take away 300 take away 50 take away1 (crossing no boundaries)
Partition and combine multiples of ones and tenths *Concrete (if necessary) – place value counters* *Pictorial – number line*	8.4 + 3.8 8.4 add 3 and 0.8 = 8.4 add 3 add 0.8 13.2 – 4.5 13.2 take away 4 and 0.5 = 13.2 take away 4 take away 0.5
Identify and use knowledge of number bonds within a calculation and identify related facts, e.g. 680 + 430, 6.8 + 4.3, 0.68 + 0.43 can all be worked out using the related calculation 68 + 43 *Concrete (if necessary) – place value counters* *Pictorial – related facts addition trios*  	0.62 + 0.38 using knowledge of 62 + 38 = 100 0.75 + 0.56 using knowledge of 75 + 56 = 131 2.8 + 0.43 using knowledge of 280 + 43 = 323 1 – 0.41 using knowledge of 100 – 41 = 59 0.92 – 0.35 using knowledge of 92 – 35 = 57 8.3 – 0.52 using knowledge of 830 – 52 = 778
Find differences by counting up through the next multiple of 0.1, 1, 10, 100 or 1000 *Pictorial – number line*	8.2 – 3.46 14.23 – 7.58
Bridge through 10 when adding or subtracting a single digit number (partitioning, e.g. 58 + 5 = 58 + 2 + 3 or 76 – 8 = 76 – 6 – 2)	1.5 + 1.7as 1.5 + 0.5 + 1.2

Pictorial – number line	0.7 + 0.56 as 0.7 + 0.3 + 0.26 8.3 – 2.7 as 8.3 – 2.3 – 0.4
Add or subtract a multiple of 1 or 10 and adjust (for those numbers close to multiples of 1 or 10) *Pictorial – number line*	5.6 + 3.9 as 5.6 + 4 – 0.1 7.5 – 4.8 as 7.5 – 5 + 0.2
Mental Calculation Strategies – Multiplication and Division	
Multiply whole numbers and decimals to three decimal places by 10, 100 and 1000 *Pictorial – place value chart*	4562 x 1000 9.682 x 10 25.784 x 100
Use partitioning to double or halve any number *Concrete (if necessary) – place value counters* *Pictorial – partitioning diagram*	What is double 34.7? What is half of 456? 34.5 ÷ 2 = 409 x 2 =
Identify and use all related facts that link to tables *Pictorial – related facts multiplication trios* 42 (7, 6) 42000 (7, 6000)	7000 x 6 becomes 7 x 1000 x 6 reordered as 7 x 6 x 1000 500 x 40 becomes 5 x 100 x 4 x 10 reordered as 5 x 4 x 100 x 10 900 x 300 becomes 9 x 100 x 3 x 100 reordered as 9 x 3 x 100 x 100 3000 x 80 becomes 3 x 1000 x 8 x 10 reordered as 3 x 8 x 1000 x 10
Use related facts to multiply 0.0t by a one-digit number *Pictorial – related facts multiplication trios* 24 (8, 3) 0.24 (8, 0.03)	0.03 x 7 related to 3 x 7 = 21 0.06 x 9 related to 6 x 9 = 54 0.05 x 4 related to 5 x 4 = 20
Use related facts to divide TU by 0.t *Pictorial – related facts multiplication/division trios* 72 (8, 9) 72 (0.8, 90)	56 ÷ 0.8 related to 56 ÷ 8 = 7 21 ÷ 0.7 related to 21 ÷ 7 = 3 36 ÷ 0.9 related to 36 ÷ 9 = 4 48 ÷ 0.4 related to 48 ÷ 4 = 12
Recall prime numbers up to 19	Instantly know the prime numbers 2, 3, 5, 7, 11, 13, 17, 19
Use related facts to divide 0.th by 0.t *Pictorial – related facts multiplication/division trios* 45 (5, 9) 0.45 (0.5, 9)	0.32 ÷ 0.4 related to 32 ÷ 4 = 8 0.64 ÷ 0.8 related to 64 ÷ 8 = 8 0.45 ÷ 0.9 related to 45 ÷ 9 = 5

Th H T U • t h th

Use compensation to multiply U.9 and U.99 by a one-digit number *Pictorial – rectangle with given dimensions*	5.9 x 4 understood as 6 x 4 – 0.1 x 4 3.99 x 7 understood as 4 x 7 – 0.01 x 7 9.99 x 6 understood as 10 x 4 – 0.01 x 6
Use partitioning to multiply 0.th by a one-digit number *Pictorial – partitioning diagram*	0.76 x 3 0.28 x 7 0.54 x 6
Use partitioning to double numbers including those with two and three decimal places *Concrete (if necessary) – place value counters* *Pictorial – partitioning diagram*	Double 3.421 Double 6.705 Double 12.594 Double 54 672 Double 674 960
Divide whole numbers and decimals to three decimal places by 10, 100 and 1000 *Pictorial – place value chart*	356.7 ÷ 100 9.83 ÷ 10 7.04 ÷ 10 860.2 ÷ 100 56 789 ÷ 1000
Use related facts to divide by 50 *Pictorial – place value chart if necessary for initial step of ÷ 100*	4100 ÷ 50 understood as (4100 ÷ 100) x 2 7800 ÷ 50 understood as (7800 ÷ 100) x 2 530 ÷ 50 understood as (530 ÷ 100) x 2
Use related facts to divide by 25 *Pictorial – place value chart if necessary for initial step of ÷ 100*	3200 ÷ 25 understood as (3200 ÷ 100) x 4 7600 ÷ 25 understood as (7600 ÷ 100) x 4 360 ÷ 25 understood as (360 ÷ 100) x 4
Use partitioning to divide ThHTU by a one-digit number *Concrete (if necessary) – place value counters* *Pictorial – partitioning diagram*	5035 ÷ 5 by partitioning into 5000 and 35 (multiples of 5 totalling 5035) 1236 ÷ 4 by partitioning into 1200 and 36 (multiples of 4 totalling 1236) 9240 ÷ 6 by partitioning into 6000 and 3000 and 240 (multiples of 6 totalling 9240)
Use related facts to divide U.t by 0.t	
Use partitioning to divide HTU by U	