Hamworthy Primary Schools Calculation Policy

"Maths at Hamworthy"

'Every Child, Every Day, Every Possibility'

Last reviewed May 2026

This calculation policy has been created and designed to ensure that all children at Hamworthy Primary Schools develop a deep and secure understanding of the mathematical concepts within the EYFS Framework and the Primary National Curriculum. It incorporates the teaching for mastery approach as well as an emphasis on the use of concrete, pictorial and abstract representations for each objective.

The policy breaks down each objective into its respective year group from Nursery through to Year 6 and outlines the key vocabulary the children should be exposed to for their stage. Some topics are broken down discretely as the approach can be applied across all years.
Further guidance can be found in the appendices

At the Hamworthy Primary Federation, we aim to develop children as mathematicians who demonstrate these characteristics:

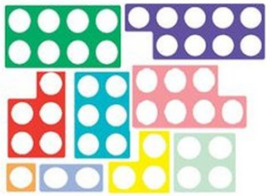
- A belief that by demonstrating a growth mindset, they can succeed.
- A deep routed understanding of the concrete and pictorial representations of number.
- A secure understanding of key facts such as number bonds and multiplication tables to allow fluency across different areas of maths.
- To recognise that practice is a vital part of learning and that intelligent practice reinforces pupils' procedural fluency and develops their conceptual understanding.
- The ability to make links between knowledge and application across the curriculum and in their lives.
- To develop deep and long lasting understanding of mathematical procedures and concepts.
- To achieve mastery through acquiring deep, long term, secure and adaptable subject knowledge.

Manipulatives and Concrete Resources

We use a variety of equipment to support children's learning in Mathematics. These 'manipulatives' play a useful role in the teaching of maths, particularly the teaching of concepts. Here is a description of some of the equipment we use frequently across the year groups.

Numicon

Numicon apparatus is a multi-sensory equipment. The numicon patterns are arranged of holes in plastic shapes that correspond to the numbers 1-10.



Unifix cubes

Multilink and unfix cubes can be grouped together to make numbers in different ar-rangements for example in groups of 2's, 5's or 10's.



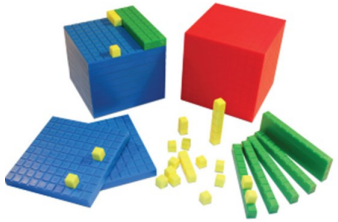
Place value counters

Place value counters are used to support children as they move from the concrete to the abstract.



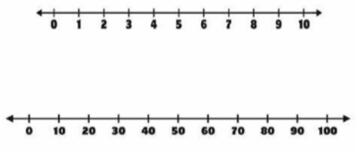
Dienes

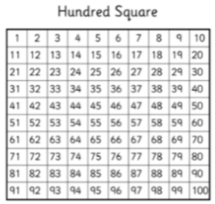
Dienes apparatus are organised in 1 cubes, 10 rods, 100 sheets and 1000 cubes. They are used to visualise numbers up to 2 digits in KS1 and up to 4 digits in KS2.



Number line and Hundred square

Number lines and hundred squares are used to support children visualising numbers in the correct order and recognising number patterns and sequences.



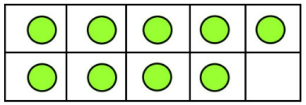


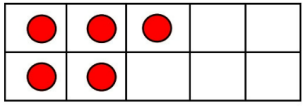
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Bead strings and Tens Frames

Bead strings and tens frames are used to support children's understanding of number bonds to ten and 20.

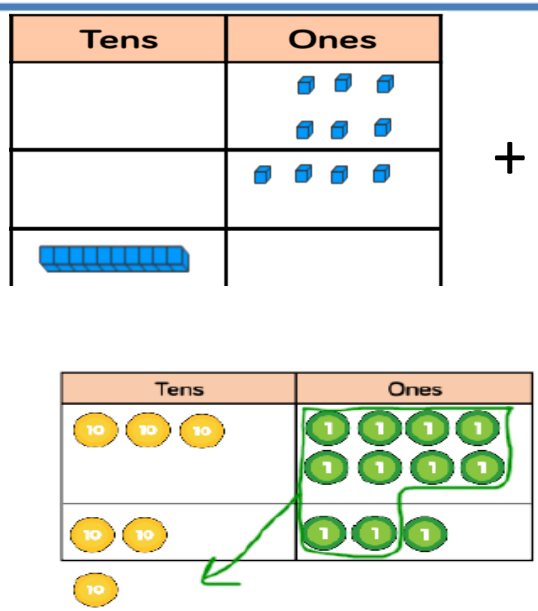






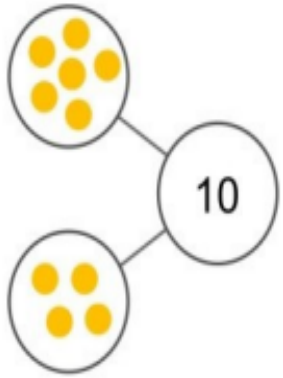
Models and Pictorial Diagrams

Models and pictorial diagrams are used as a bridge between the concrete manipulatives children have used and the abstract symbols and methods they must learn to use. Connections between these models should be made, so that children understand the same mathematics is represented in different ways. Asking the question "What's the same what's different?" has the potential for children to draw out the connections.



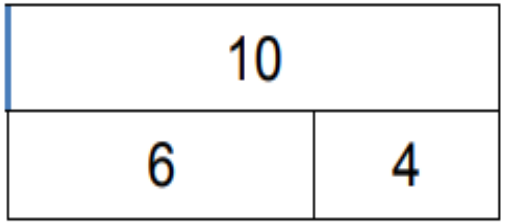
Base-Ten and

Place Value Pictorial



6 + 4 = 10
4 + 6 = 10
10 – 4 = 6
10 – 6 = 4

Part Whole Model



6 + 4 = 10
4 + 6 = 10
10 – 4 = 6
10 – 6 = 4

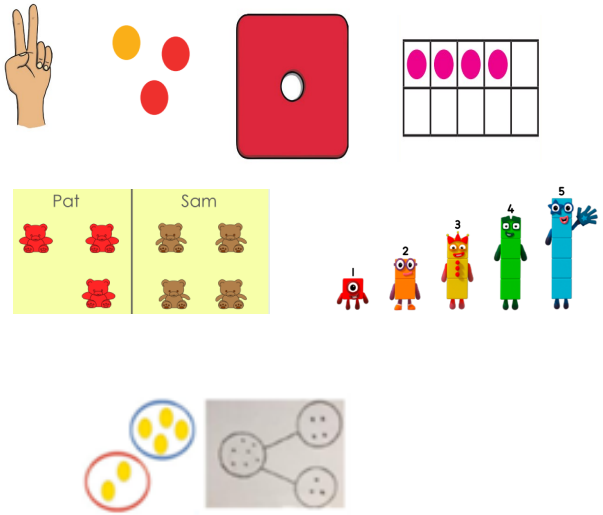
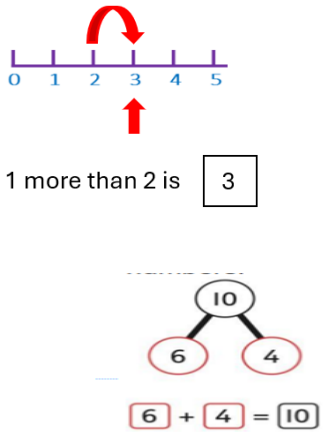
Bar Model

Reception

EYFS statutory Framework:

Children in Reception are taught in line with the Statutory Framework for the Early Years Foundation Stage, to ensure that all children develop firm mathematical foundations in a way that is engaging, and appropriate for their age. Children develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. Within the curriculum, rich opportunities are provided to develop spatial reasoning skills across all areas of mathematics including shape, space and measure. Practical apparatus and activities are thoughtfully selected and incorporated to develop a curiosity and love of Mathematics.

EYFS Addition

Concrete	Pictorial	Abstract
		

Children are encouraged to gain a sense of the number system through the use of counting concrete objects.

Subitise different arrangements, both unstructured and structured

Understand the 'one more than' relationship between consecutive numbers.

Explore the composition within a number.

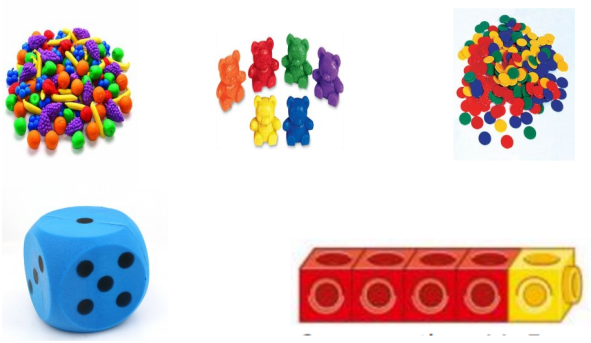
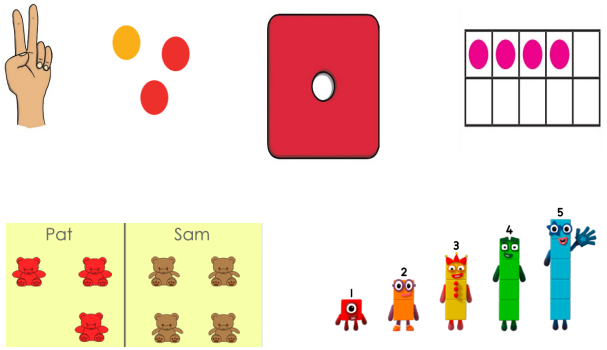
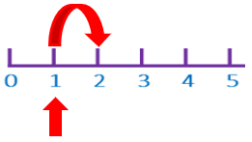
They combine objects in practical ways and count all.

They understand addition as counting on and will count on in ones using objects, cubes, bead string and number line.

They use concrete and pictorial representation to record their calculations.

They begin to use + and = They are encouraged to develop a mental picture of the number system in their heads to use for calculations.

EYFS Subtraction

Concrete	Pictorial	Abstract
		 1 less than 2 is 1 5-1=4

Children are encouraged to gain a sense of the number system through the use of counting concrete objects.

Subitise different arrangements, both unstructured and structured

Understand the 'one fewer/less than' relationship between consecutive numbers.

Explore the composition within a number.

They begin to count back in ones using objects, cubes, bead string and number line.

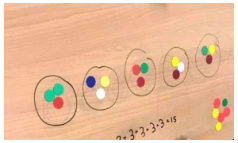
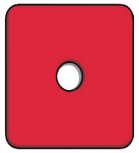
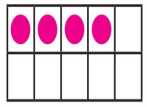
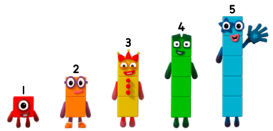
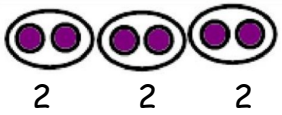
They understand subtraction as taking away and the amount or number becoming smaller.

They use concrete and pictorial representation to record their calculations.

They begin to use - and =

They are encouraged to develop a mental picture of the number system in their heads to use for calculations.

EYFS Multiplication

Concrete	Pictorial	Abstract
     	       	 2 2 2 = 6

Children are encouraged to gain a sense of the number system through the use of counting concrete objects.

Subitise different arrangements, both unstructured and structured.

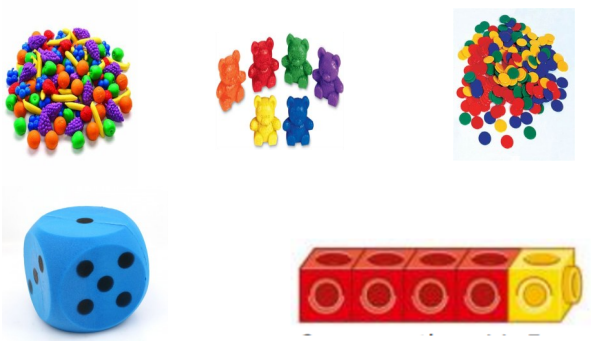
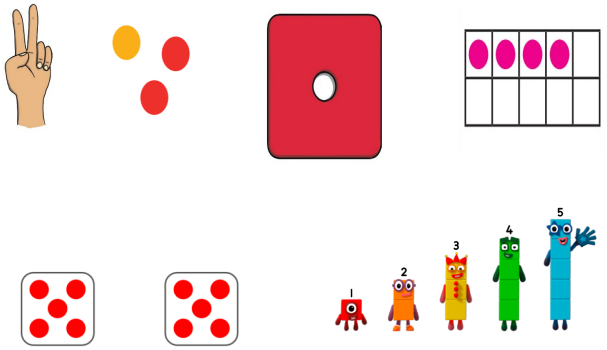
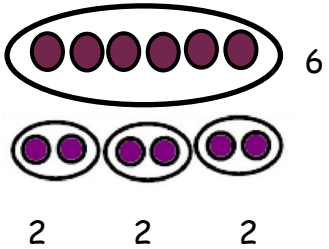
Explore the composition within a number.

Children use concrete objects to make and count equal groups of objects.

They will count on in twos using a bead string and number line.

They understand doubling as repeated addition. 2 + 2 = 4

EYFS Division

Concrete	Pictorial	Abstract
		

Children are encouraged to gain a sense of the number system through the use of counting concrete objects.

Subitise different arrangements, both unstructured and structured.

Explore the composition within a number.

Children use concrete objects to count and share equally into 2 groups. 6 cakes shared between 2 people each person gets 3 cakes.

They count a set of objects and halve them by making two equal groups.

They understand sharing as splitting an amount into equal groups. They understand that you can only find halve of an even number. Children to use knowledge of doubles to support halving.

They will begin to use objects to make groups of 2 from a given amount.

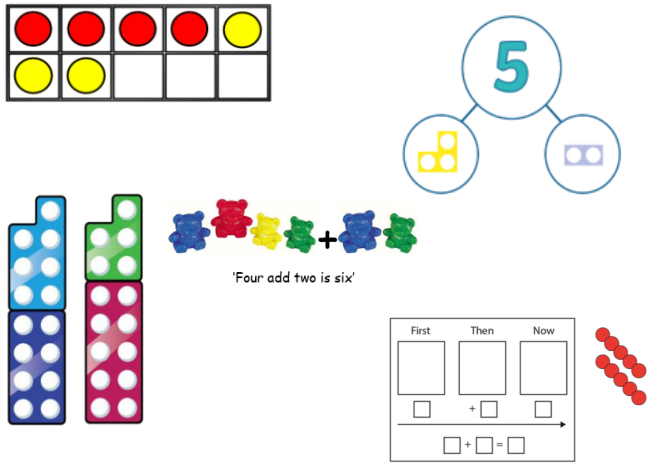
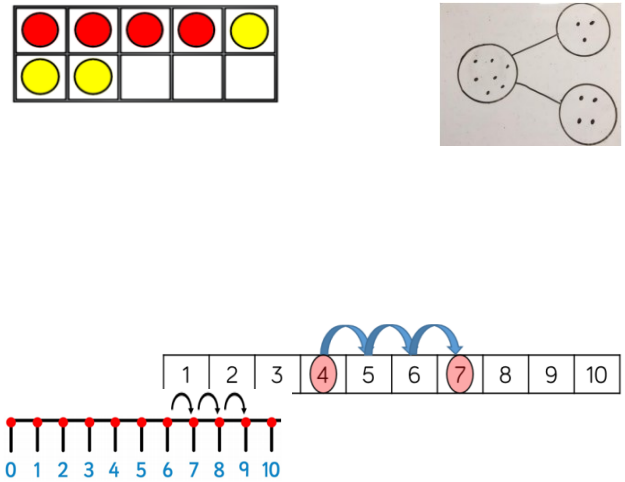
They use concrete and pictorial representation to record their calculations.

Year 1 Addition

National Curriculum Objective: represent and use number bonds and related subtraction facts within 20

add one-digit and two-digit numbers to 20, including zero

Vocabulary: digit, numeral, number, greater, larger, total, equals, altogether, addition, plus, sum, equation, expression, addends, commutative, how many altogether, first, then, now

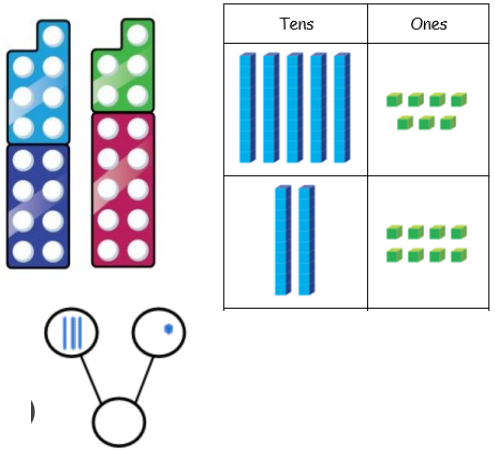
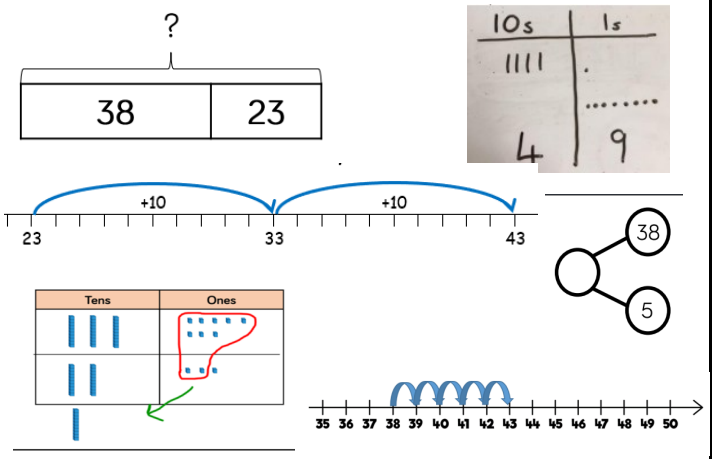
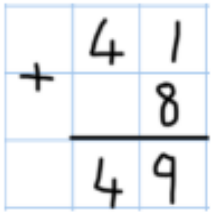
Concrete	Pictorial	Abstract
		$4 + 3 = 7$ $17 + 3 = 20$
Children to explore both aggregation (combing two parts to make a whole) and augmentation (first, then, now). Children to start by counting on in steps of one and find one more than a given number. Then move onto combining two sets od objects to recount them. When adding one-digit numbers that cross 10, it is important to highlight the importance of ten ones equaling one ten. Use deines when adding two digit + one digit numbers.	The part whole, tens frame, bar model can be used to show two numbers coming together to create a total. This will build on their knowledge of partitioning from number and place value. Ten frames and part-whole to support number bonds. Children to represent the objects using dots in part, part, whole. When using number track/ number line method, ensure emphasis on starting at given number and counting on it ones slowly.	Formal written method is introduced. Emphasis on ensuring the digits are aligned properly and using correct mathematical symbols. Children to understand that addition can be done in any order but it is more efficient to begin with the greater number. Children solve missing number problems. Children spend time looking systematically at find number bonds of 10. Children use both pictorial representation of counters and then abstractly to solve equation.

Year 2 Addition

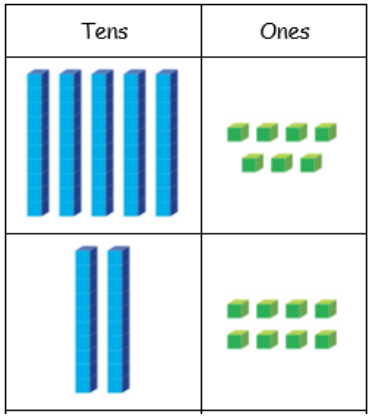
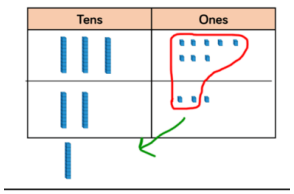
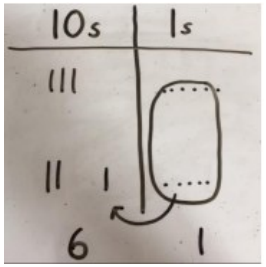
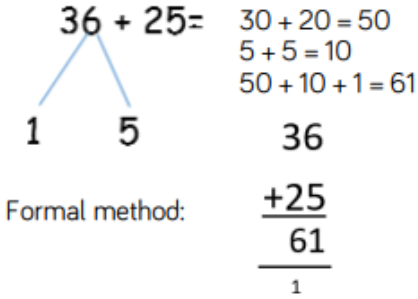
National Curriculum Objective: recall and use addition facts to 20 fluently, and derive and use related facts up to 100

add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers, adding three one-digit numbers

Vocabulary: digit, numeral, number, greater, larger, total, equals, altogether, addition, plus, sum, column, regroup

Concrete	Pictorial	Abstract
		1 + 8 = 9 40 + 9 = 49 38 + 23 = 61 
Children to use deines to represent the addition. Ensure children write the numbers along side any concrete resources. First children are shown with no regrouping or exchanging. Then progress to showing how to regroup and exchange a group of 10 or more to the next column. When adding single digits to a two-digit number children should be encouraged to count on from the larger number. The children should apply their knowledge of number bonds to add more efficiently e.g. 8+5= 13 so 38+5=43	The part whole, tens frame, bar model, number line can be used to show two numbers coming together to create a total. This will build on their knowledge of partitioning from number and place value.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. Children to use blank number lines to count on to find the total. Encourage them to jump to multiples of 10 to become more efficient.

Year 2 Addition with regrouping

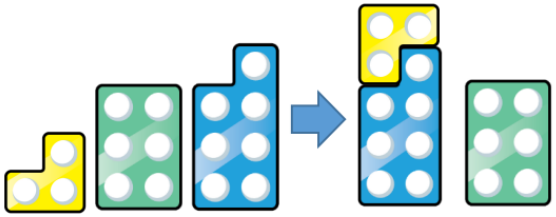
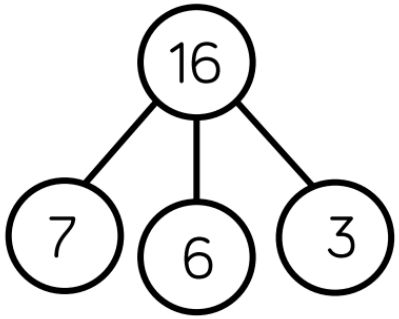
Concrete	Pictorial	Abstract
	 	

Once children are secure in using deines both concrete and pictorial to add one and two digit numbers, regrouping and exchanging can be introduced.

Children to circle ones to represent grouping of ten and then the arrow to show the exchange.

Year 2 Addition: adding three one-digit numbers

National Curriculum Objective: recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

Concrete	Pictorial	Abstract
		$7 + 6 + 3 = 16$ $7 + 6 + 3 = 16$ 10

Concrete example if needed to support children who are working at a Year 1 level.

When adding three 1-digit numbers, children should be encouraged to look for number bonds to 10 or doubles to add the numbers more efficiently. This supports children in their understanding of commutativity.

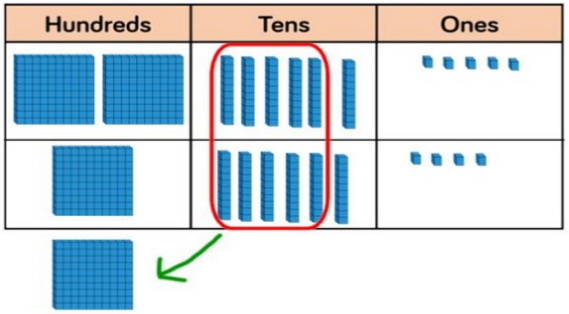
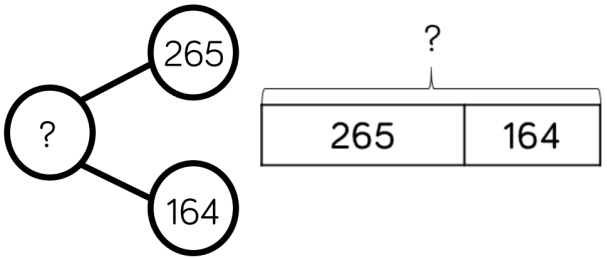
Manipulatives that highlight number bonds to 10 are effective when adding three 1-digit numbers.

Derive known facts:

Year 3 Addition

National Curriculum Objective: add and subtract numbers with up to three digits, using formal written methods of column addition and subtraction

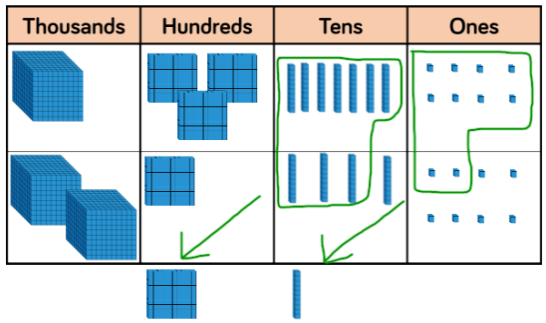
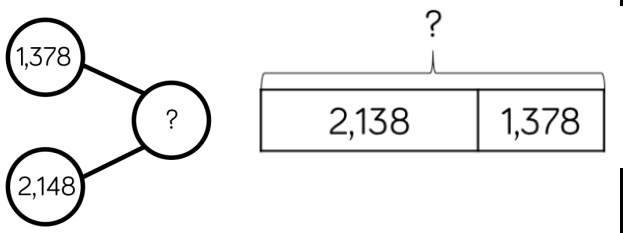
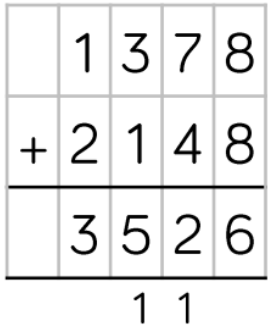
Vocabulary: digit, column, add, greater, exchange, rename, larger, total, altogether, sum, plus

Concrete	Pictorial	Abstract
		$\begin{array}{r} 265 \\ +\ 164 \\ \hline 429 \\ \hline 1 \end{array}$
Children begin the concept by using base ten to represent the addition. Ensure children write the numbers along side any concrete resources. First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column.	The part whole and bar model can be used to show two numbers coming together to create a total. This will build on their knowledge of partitioning from number and place value.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. When progressing to exchanging and renaming, children to mark this with a 1 underneath the column. Exchanging and renaming across two columns must be taught also. Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Year 4 Addition

National Curriculum Objective: add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate

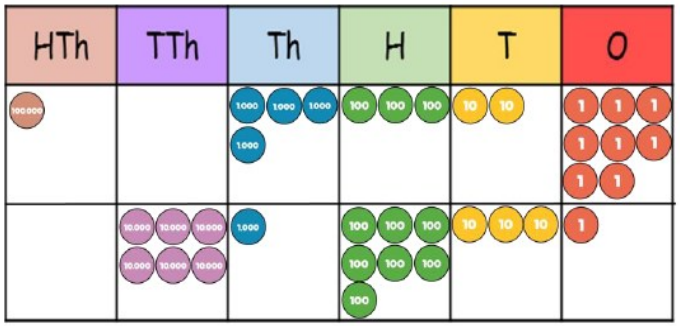
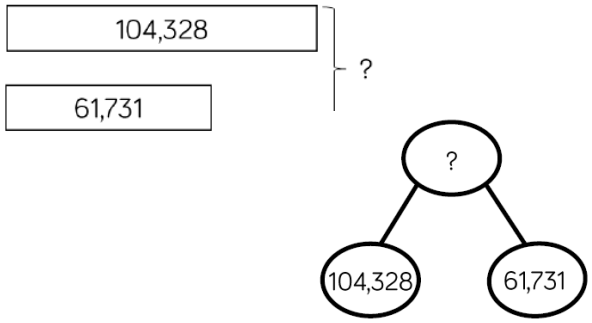
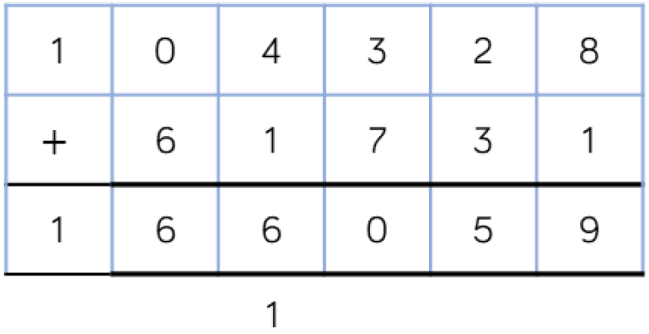
Vocabulary: digit, column, add, greater, exchange, rename, larger, total, altogether, sum, plus

Concrete	Pictorial	Abstract
		
Children begin the concept by using base ten to represent the addition. Ensure children write the numbers along side any concrete resources. First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column.	The part whole and bar model can be used to show two numbers coming together to create a total. This will build on their knowledge of partitioning from number and place value.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. When progressing to exchanging and renaming, children to mark this with a 1 underneath the column. Exchanging and renaming across two columns must be taught also. Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Year 5/6 Addition

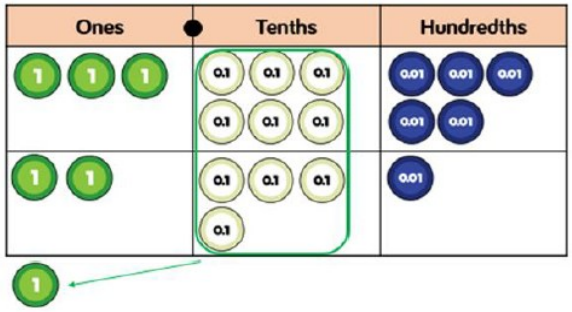
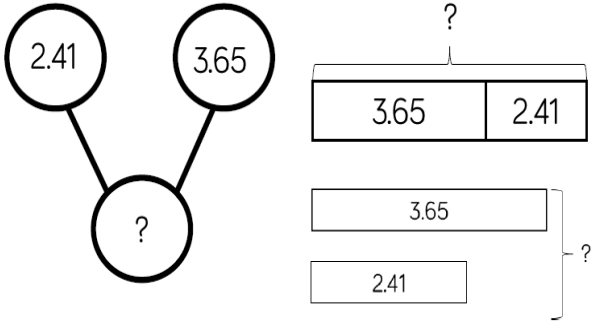
National Curriculum Objective: add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)

Vocabulary: digit, column, add, greater, exchange, rename, larger, total, altogether, sum, plus

Concrete	Pictorial	Abstract
		
Children begin the concept by using place value counters. First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column.	The part whole and bar model can be used to show two numbers coming together to create a total. This will build on their knowledge of partitioning from number and place value.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. When progressing to exchanging and renaming, children to mark this with a 1 underneath the column. Exchanging and renaming across two columns must be taught also. Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Year 5/6 Addition of Decimals

Vocabulary: ones, tenths, hundredths, thousands, decimal place, digit, column, add, greater, exchange, rename, larger, total, altogether, sum, plus

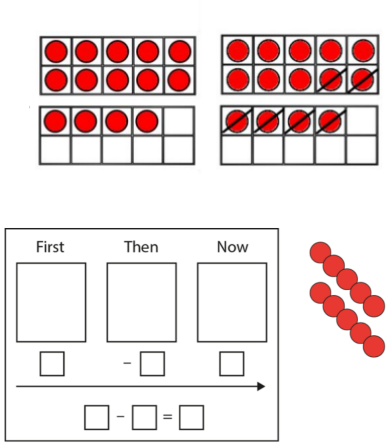
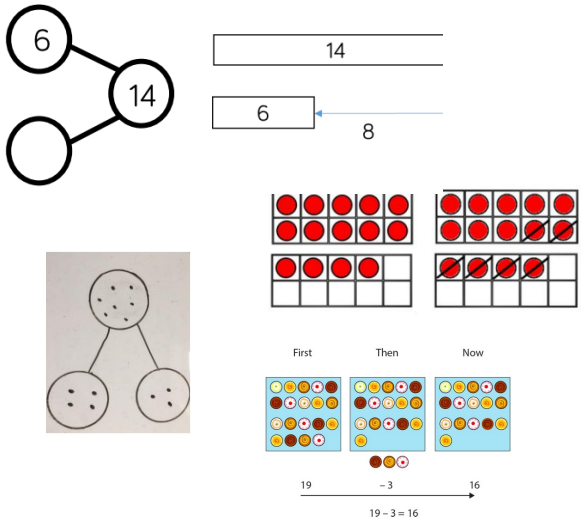
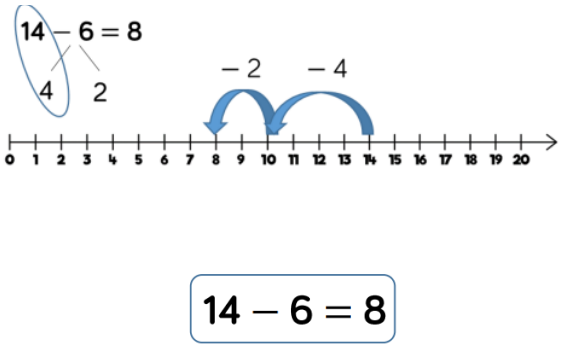
Concrete	Pictorial	Abstract
		$\begin{array}{r} 3.65 \\ +\ 2.41 \\ \hline 6.06 \\ \hline 1 \end{array}$
Children begin the concept by using place value counters to represent the tenths, hundredths and thousands. First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column. This should build from the knowledge of decimals and place value.	The part whole and bar model can be used to show two numbers coming together to create a total. This will build on their knowledge of partitioning from number and place value. The context of money and measure should be explored while teaching this topic.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. There should also be emphasis of the decimal point being ON the line. When progressing to exchanging and renaming, children to mark this with a 1 underneath the column. Exchanging and renaming across two columns must be taught also.

Year 1 Subtraction

National Curriculum Objective: represent and use number bonds and related subtraction facts within 20

subtract one-digit and two-digit numbers to 20, including zero

Vocabulary: digit, subtract, take away, minus, smaller, less, difference, equals, total, minus, decrease, fewer, how many are left, inverse, first, then, now minuend, expression, equation

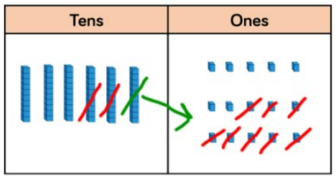
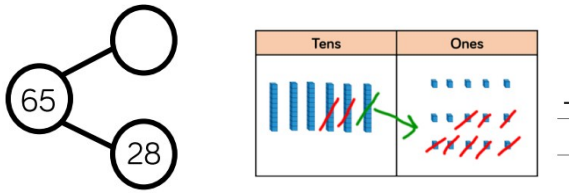
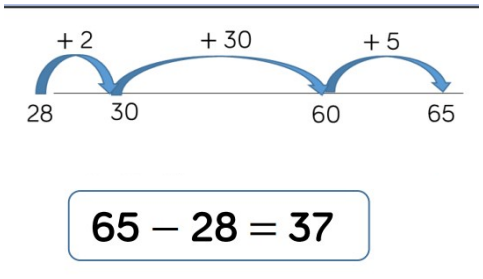
Concrete	Pictorial	Abstract
		
Children begin the concept by using first then and now stories. Then the children explore subtraction using tens frames to represent the Subtraction. Ensure children write the numbers along side any concrete resources.	The children complete first, then, now stories to sup port how to understand subtraction. The part whole and bar model can be used to show that subtraction is taking away part of a number as well as there being a difference between he size of the numbers. This will build on their knowledge of partitioning from number and place value. NCETM focus on using addition knowledge to solve subtraction as the inverse.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. When progressing to exchanging and renaming, children to mark this by drawing a line though the digit being ex-changed from, rewriting the digit one less above it and then showing the exchanged digit with a 1 in the next column. Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Year 2 Subtraction

National Curriculum Objective: recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100

subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers

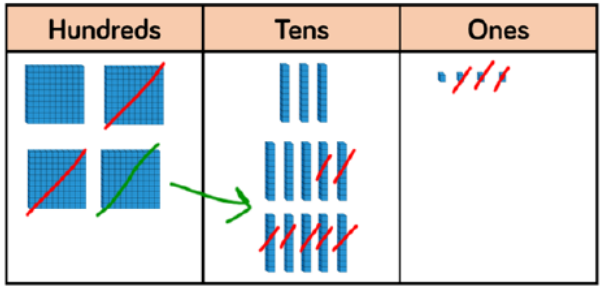
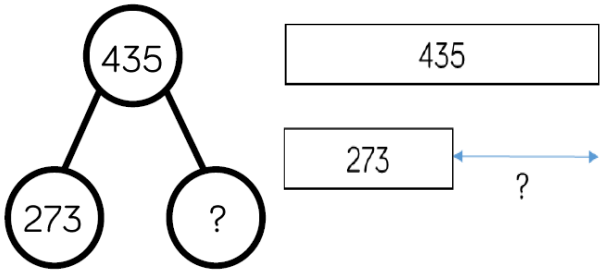
Vocabulary: digit, subtract, take away, minus, smaller, less, difference, equals, total, minus, decrease, fewer, how many are left, column, regroup, exchange

Concrete	Pictorial	Abstract
		
Children begin the concept by using dienes to represent the Subtraction. Ensure children write the numbers along side any concrete resources. First children are shown with no regrouping and exchanging. Then progress to showing how to regroup and exchange a group of 10 or more to the next column.	The part whole and bar model can be used to show that subtraction is taking away part of a number as well as there being a difference between he size of the numbers. This will build on their knowledge of partitioning from number and place value.	Formal written method is introduced with no exchanging and regrouping. Emphasis on ensuring the digits are aligned properly. Use a blank number line When progressing to exchanging and regrouping, children to mark this by drawing a line though the digit being exchanged from, rewriting the digit one less above it and then showing the exchanged digit with a 1 in the next column. Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Year 3 Subtraction

National Curriculum Objective: add and subtract numbers with up to three digits, using formal written methods of column addition and subtraction

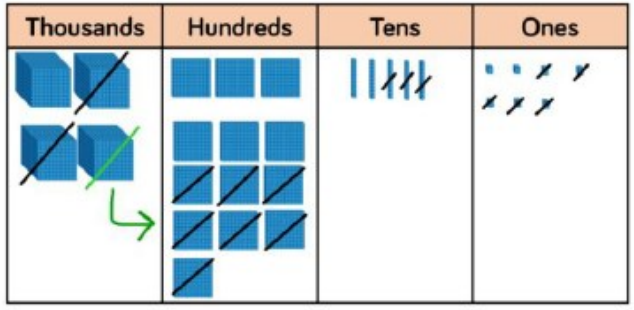
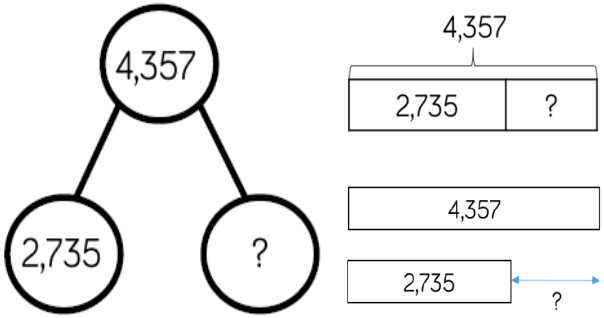
Vocabulary: digit, column, subtract, smaller, less, difference, exchange, rename, total, minus, decrease, fewer

Concrete	Pictorial	Abstract
		$435 - 273 = 262$ $\begin{array}{r} {}^{3}\not{4}{}^{1}35 \\ -\ 273 \\ \hline 262 \end{array}$
Children begin the concept by using base ten to represent the Subtraction. Ensure children write the numbers along side any concrete resources. First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column.	The part whole and bar model can be used to show that subtraction is taking away part of a number as well as there being a difference between he size of the numbers. This will build on their knowledge of partitioning from number and place value.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. When progressing to exchanging and renaming, children to mark this by drawing a line though the digit being exchanged from, rewriting the digit one less above it and then showing the exchanged digit with a 1 in the next column. Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Year 4 Subtraction

National Curriculum Objective: add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate

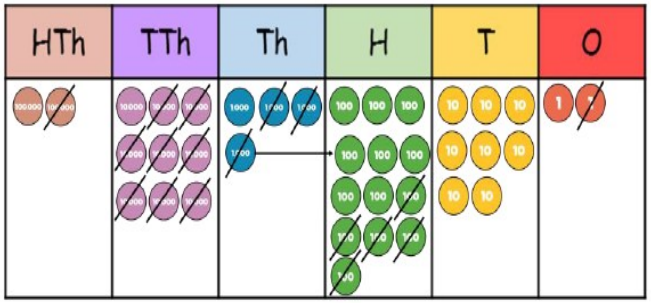
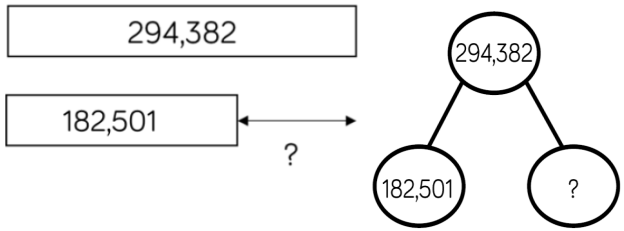
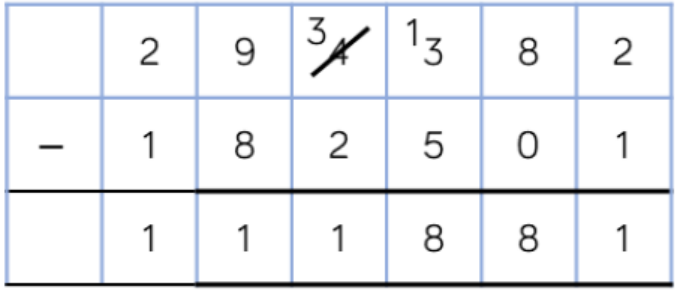
Vocabulary: digit, column, subtract, smaller, less, difference, exchange, rename, total, minus, decrease, fewer

Concrete	Pictorial	Abstract
		4,357 – 2,735 = 1,622 3 1 4357 – 2735 1622
Children begin the concept by using base ten to represent the Subtraction. Ensure children write the numbers along side any concrete resources. First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column.	The part whole and bar model can be used to show that subtraction is taking away part of a number as well as there being a difference between the size of the numbers. This will build on their knowledge of partitioning from number and place value.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. When progressing to exchanging and renaming, children to mark this by drawing a line though the digit being exchanged from, rewriting the digit one less above it and then showing the exchanged digit with a 1 in the next column. Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Year 5/6 Subtraction

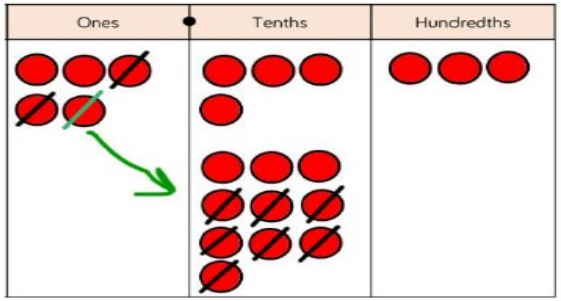
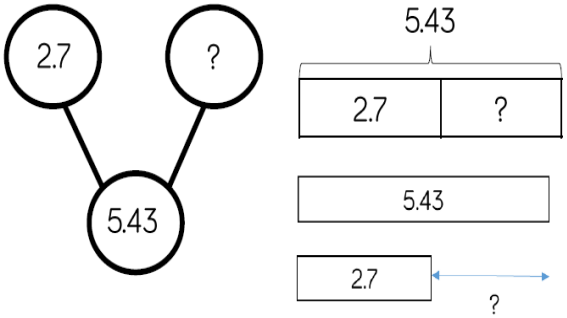
National Curriculum Objective: add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)

Vocabulary: digit, column, subtract, smaller, less, difference, exchange, rename, total, minus, decrease, fewer

Concrete	Pictorial	Abstract
		
Children begin the concept by using place value counters to represent the subtraction First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column.	The part whole and bar model can be used to show that subtraction is taking away part of a number as well as there being a difference between the size of the numbers. This will build on their knowledge of partitioning from number and place value.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. When progressing to exchanging and renaming, children to mark this by drawing a line though the digit being exchanged from, rewriting the digit one less above it and then showing the exchanged digit with a 1 in the next column. Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Year 5/6 Subtraction of Decimals

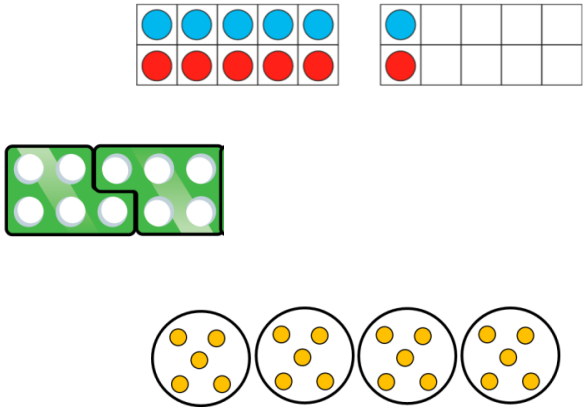
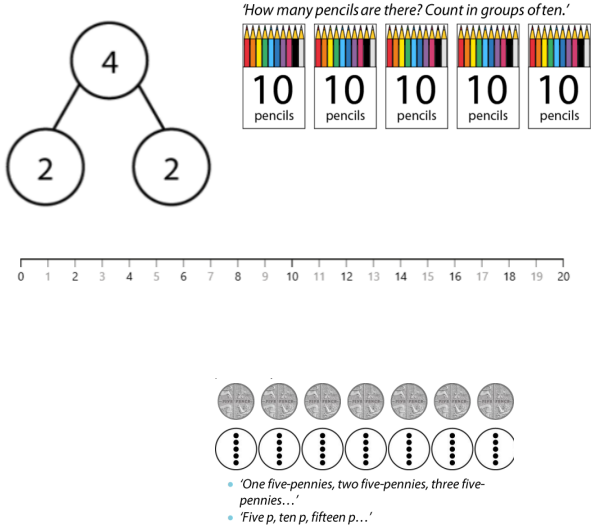
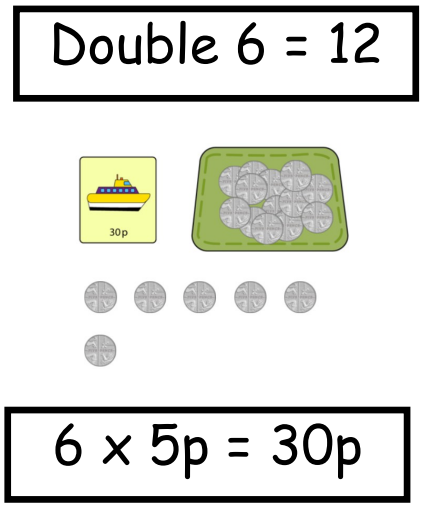
Vocabulary: ones, tenths, hundredths, thousands, decimal place, digit, column, subtract, less, exchange, rename, smaller, total, minus.

Concrete	Pictorial	Abstract
		$\begin{array}{r} {}^{4}\not{5}.{}^{1}43 \\ -\ 2.7 \\ \hline 2.73 \end{array}$
Children begin the concept by using place value counters to represent the tenths, hundredths and thousands. First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column. This should build from the knowledge of decimals and place value.	The part whole and bar model can be used to show subtraction is taking away part of a number as well as there being a difference between the size of the numbers. The context of money and measure should be explored while teaching this topic.	Formal written method is introduced with no exchanging and renaming. Emphasis on ensuring the digits are aligned properly. There should also be emphasis of the decimal point being ON the line. When progressing to exchanging and renaming, children to put a line through the number being exchanged from and then write the digit 1 less above it. Mark the exchange with a little one in the next column. Exchanging and renaming across two columns must be taught also.

Year 1 Multiplication

National Curriculum Objective: solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

Vocabulary: multiplies, groups of, repeated, counting on, how many altogether

Concrete	Pictorial	Abstract
		
Children explore, identify and recall doubles up to 9. Children use numicon and counters on a tens frame to represent the doubles. The children use concrete representations count on in 2s, 5,s 10s. Children will use money context to support the understanding.	Children to use the part part whole to represent double of any number up to 9. Children to use pictorial representations to count on in 2s, 5s, 10s. Children to use these representations to find sequences/patterns of numbers. Children to count on and look at multiplication as	Children to write double equations. Children to partition a number and then double Children will use stem sentences to support counting on in 2s, 5s, 10s. Children will solve a range of problems by counting in groups of 2s, 5,s 10s. Children will be exposed to the X symbol as groups of to support finding an answer to the problem.

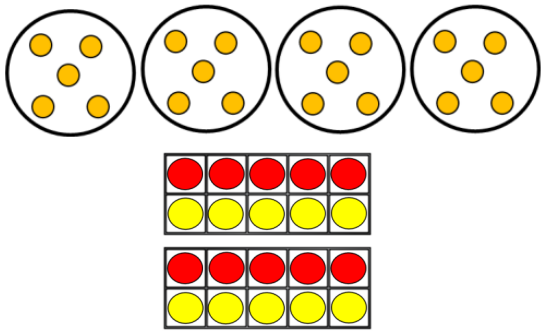
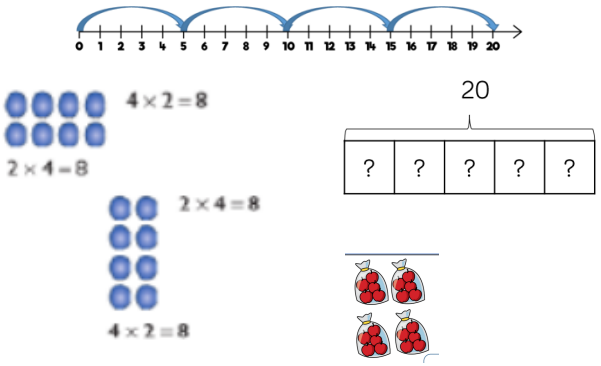
Year 2 Multiplication

National Curriculum Objective: Recall and use multiplication facts for the 2, 5 and 10 multiplication tables

Calculate mathematical statements for multiplication using X sign and = sign

Solve problems involving multiplication using arrays, repeated addition. Mental methods and multiplication facts

Vocabulary: Multiply, multiplication, groups of

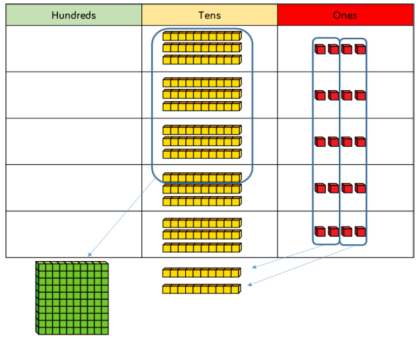
Concrete	Pictorial	Abstract
		One bag holds 5 apples. How many apples do 4 bags hold? $5 + 5 + 5 + 5 = 20$ $4 \times 5 = 20$ $5 \times 4 = 20$
Children to use concrete objects to continue to explore multiplication as groups of. Children to use counters and tens frames alongside plates and cubes to support concrete stage of multiplication. Children will be introduced to the X symbol and understand that it is linked to repeated addition.	Children to use multiplication as groups of. Children to use pictorial representations to find equal groups of. Use number lines to jump on/ skip count in groups of 2s, 5s and 10s. Children to use arrays in different rotations to find commutative multiplication equations.	Children to use record repeated addition equations. Children move onto recording multiplication equation to match pictorial representations. Children will use the X and = symbol to write and record.

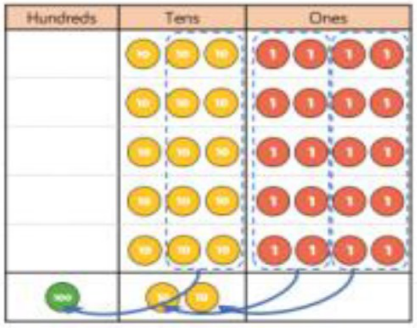
Year 3 Multiplication

National Curriculum Objective: write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

Vocabulary: digit, column, total, multiply, lots of, groups of

Concrete / Pictorial





Children begin the concept by using base ten to represent the multiplication and relate to the concept of repeated addition. E.g. 35 x 5 is 5 groups of 34. It should be used to support their understanding of the concept rather than supporting the actual multiplication itself. Ensure children write the numbers along side any concrete resources.

First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column and how to count the total.

Visuals of place value counters to be used to help with the transition to the use of the formal written method.

Abstract

	H	T	O	
		3	4	
×			5	
		2	0	(5 × 4)
+	1	5	0	(5 × 30)
	1	7	0	

	H	T	O	
		3	4	
×			5	
	1	7	0	
	1	2		

Expanded formal written method is introduced with no exchanging and renaming. Children should be shown the expanded method first so that they can relate this to the groups (e.g. 5 ground of 4, 5 groups of 30).

When progressing to exchanging and renaming, children to write the groups exchanged under the line in the next column over.

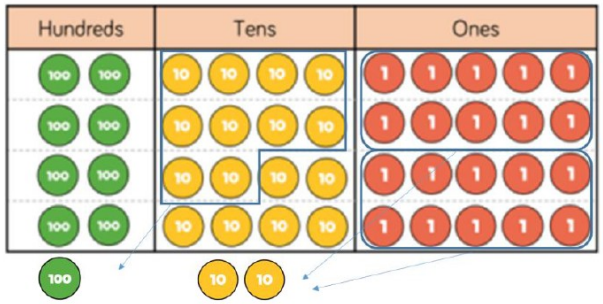
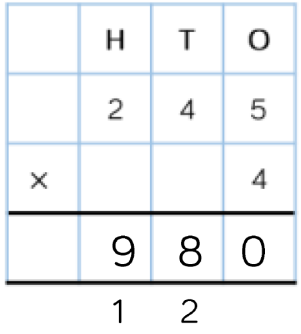
Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Formal written method should then be introduced. Ensure that numbers used to begin with are ones that most children's timestables will be secure in. i.e. 2,5,10,3 & 4

Year 4 Multiplication

National Curriculum Objective: multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Vocabulary: digit, column, total, multiply, lots of, groups of, multiple

Concrete / Pictorial	Abstract
	
Children begin the concept by using base ten to represent the multiplication and relate to the concept of repeated addition. E.g. 245 x 4 is 4 groups of 245. It should be used to support their understanding of the concept rather than supporting the actual multiplication itself. Ensure children write the numbers along side any concrete resources. First children are shown with no renaming and exchanging. Then progress to showing how to rename and exchange a group of 10 or more to the next column and how to count the total. This should then progress to renaming and exchanging across more than 1 column. Visuals of place value counters to be used to help with the transition to the use of the formal written method.	Formal written method is introduced with no exchanging and renaming. When progressing to exchanging and renaming, children to write the groups exchanged under the line in the next column over. Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column. Formal written method should be introduced ensuring that numbers used to begin with are ones that most children's timetables will be secure in. i.e. 2,5,10,3 & 4

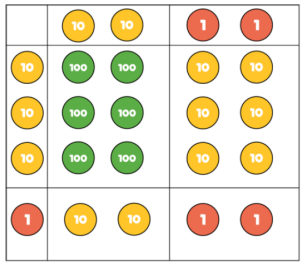
Multiplication Year 5/6

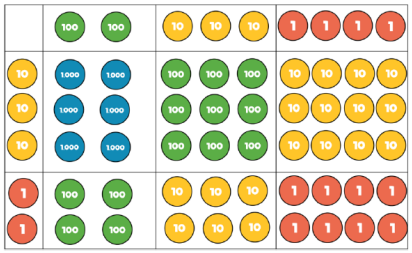
Multiplication (2 by 2, 3 by 2, 4 by 2)

National Curriculum Objective: 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

Vocabulary: digit, column, total, multiple, times, multiply, lots of, altogether , groups of.

Concrete / Pictorial





×	20	2
30	600	60
1	20	2

×	200	30	4
30	6,000	900	120
2	400	60	8

Children begin the concept of multiplying a multi-digit number by a 2 digit by using the grid method with place value counters. This is to help them visualize the size of the numbers they are using and relate back to their understanding of repeated addition. This can also be linked with their understanding of finding area.

Children can apply their knowledge of mental strategies and column addition to find the totals at this stage.

Abstract

	H	T	O
		2	2
×		3	1
		2	2
	6	6	0
	6	8	2

Th	H	T	O
	2	3	4
×		3	2
	4	6	8
1 7	1 0	2	0
7	4	8	8

TTh	Th	H	T	O
	2	7	3	9
×			2	8
2 2	1 5	9 3	1 7	2
1 5	4	7 1	8	0
7	6	6	9	2
		1		

The formal written method should be taught starting with 2 by 2, then progress to 3 by 2 before moving onto 4 by 2. Formal written method is introduced with no exchanging and renaming. When progressing to exchanging and renaming, children to write the groups exchanged under the line in the next column over.

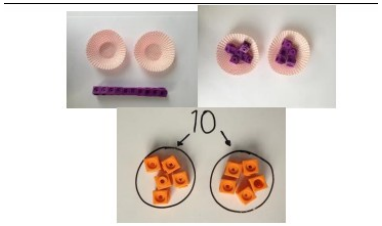
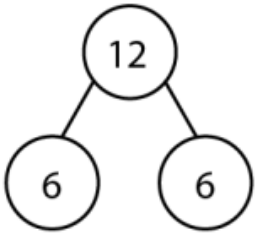
Emphasis on the value of the digits should be explained as well. E.g. we mark it with a 1 but the value is 10 because it is in the tens column.

Formal written method should be introduced ensuring that numbers used to begin with are ones that most children's timetables will be secure in. i.e. 2,5,10, 3, 4 & 8's.

Year 1 Division

National Curriculum Objective: solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

Vocabulary: halving, sharing, groups, how many left, equal amounts

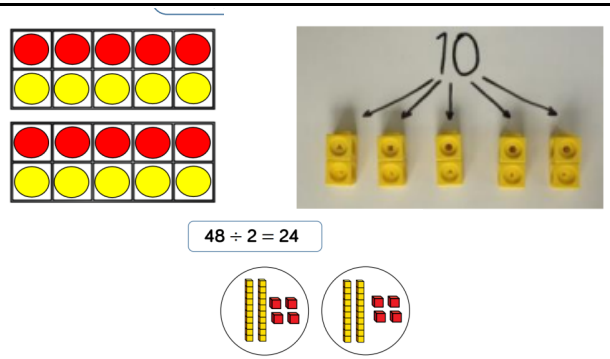
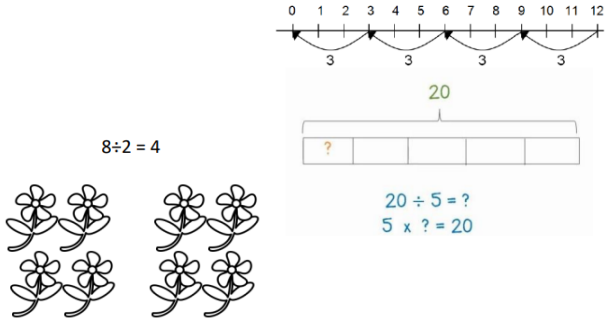
Concrete	Pictorial	Abstract
 I have 10 cubes, can you share them equally in 2 groups?		double 8 = ☐ half of 16 = ☐ double 9 = ☐ half of 18 = ☐ double 10 = ☐ half of 20 = ☐ 8-4=4 Half of 8 is 4.
Children to explore, identify and recall halves of numbers between 2 and 20. Children to understand that you have to half an even number. Children to use knowledge of doubles to make the connection of halving.	Children to use part part whole to solve halving problems.	Children will Children to use subtraction equations to record halving problem.

Year 2 Division

National Curriculum Objective: Recall and use division facts for the 2, 5 and 10, Calculate mathematical statements for division

Solve problems involving division

Vocabulary: Division, grouping, sharing, divisors, dividend, quotient

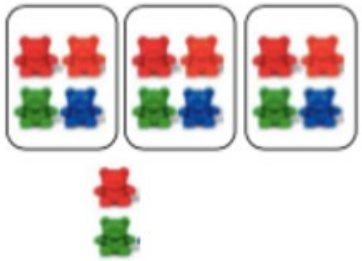
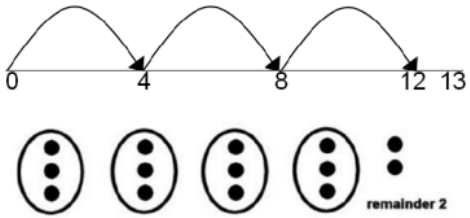
Concrete	Pictorial	Abstract
		20 ÷ 5 = 4 There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag? 28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?
The children will use concrete resources to divide quantities into equal groups. Children look at groups of and sharing to support the connection between multiplication and division. The children will use the written equation to share numbers into equal groups.	The children solve problems by grouping and counting the number of groups using both concrete and pictorial representations. Grouping encourages children to count in multiples and links with repeated subtraction on a number line. Children to share into equal groups.	Children use written methods to solve division facts. Children to solve division problems and write as an equation.

Year 2 Division with a remainder

National Curriculum Objective: Recall and use division facts for the 2, 5 and 10, Calculate mathematical statements for division

Solve problems involving division

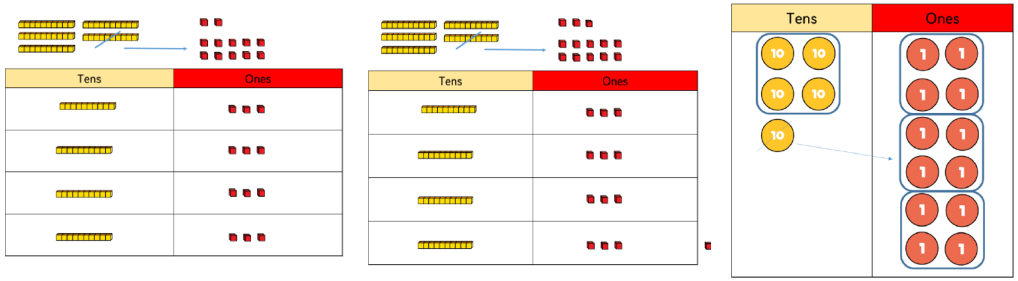
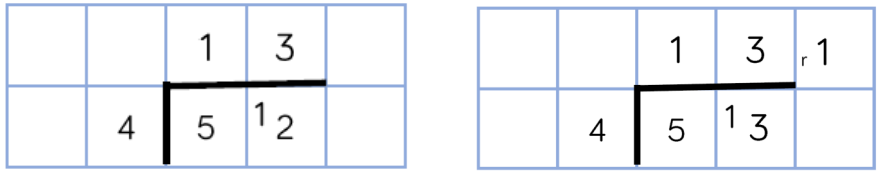
Vocabulary: Division, grouping, sharing, divisors, dividend, quotient

Concrete	Pictorial	Abstract
		
Children will use concrete objects to divide between groups and see how much is left over. Children will use their knowledge of odd and even numbers to support.	Children to use pictorial method to share into equal groups. Children to leave the reminding dots out of a group. Children to jump forward in equal groups on a number line to then see how many more you need to jump to find the remainder.	Use written methods to complete divisions and show the remainders using r.

Year 3/4 Division

National Curriculum Objective: write and calculate mathematical statements for division using the multiplication tables that they know, using mental and progressing to formal written methods *(Pupils develop reliable written methods for division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short division)*

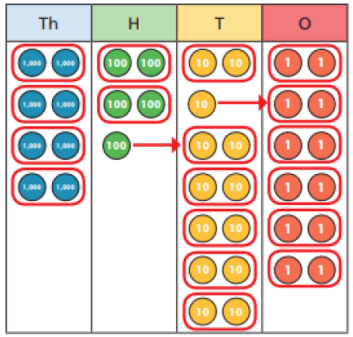
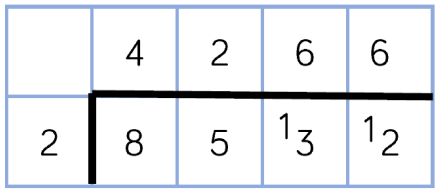
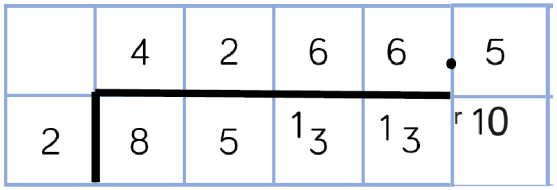
Vocabulary: sharing, grouping, exchanging

Concrete / Pictorial	Abstract
	
Children build on their understanding of their times tables knowledge by working with numbers outside of those times tables. The concept of division should start by being related to sharing. Show children how to exchanging and regrouping through use of base 10 and then share those groups equally. The concept of the remainder can then be introduced as anything that can't be shared or that will make the groups uneven. Once secure in the concept of sharing, division can be shown as grouping, starting in the largest place value and then exchanging any "remainders" into the ones collum to then be grouped again.	Once secure in the concept of division as grouping. The formal short method can be introduced. To begin with, the use of the place value counters visuals alongside this can be used to support the transition to abstract. Children should be confident in dividing numbers with no remainders before moving onto numbers that have remainders. In year 3, children should only divide 2 digit numbers by a 1 digit number. In year 4 children should progress to divide a 3 digit number by a 1 digit number.

Year 5/6 Division (short)

National Curriculum Objective: 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

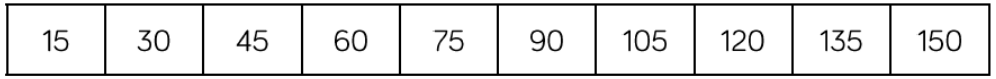
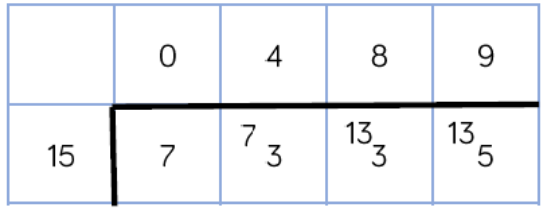
Vocabulary: sharing, grouping, exchanging

Concrete / Pictorial	Abstract
 **8,532 ÷ 2 = 4,266**	 
Children build on their understanding of division from year 4 through the concept of grouping and exchanging. Progressing up to dividing a 4 digit number by a 1 digit number with increasingly harder numbers. Children should continue to work with numbers that give remainders when divided and be encouraged to move away from concrete and pictorial representations when doing their workings.	Dividing a 4 digit by a 1 digit will building on their understanding of the short division method from year 4. Children should be confident in dividing numbers with no remainders before moving onto numbers that have remainders. Explain that remainders can be represented as a decimal by writing a "0" after the remainder and then dividing again (as shown in the example above). Relate decimal remainders to their understanding of fractions.

Year 6 Division (short)

National Curriculum Objective: 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

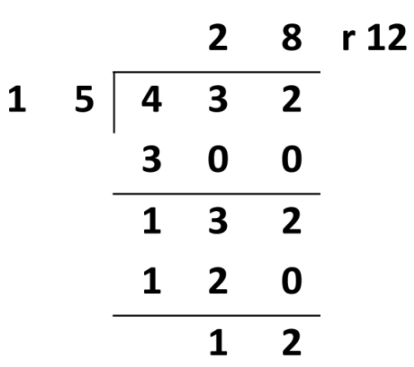
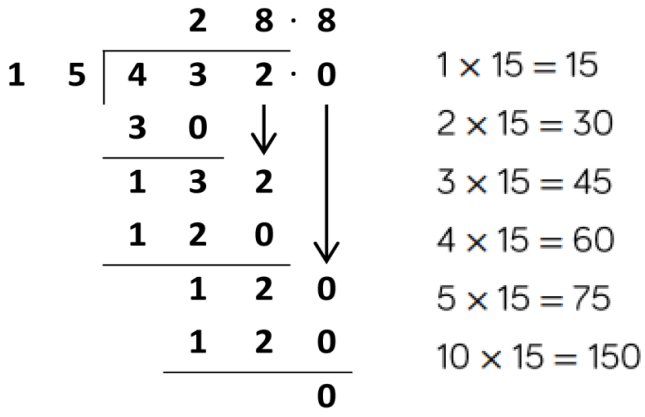
Vocabulary: sharing, grouping, exchanging

Concrete / Pictorial	Abstract
	 7,335 ÷ 15 = 489
At this point children should have secure understanding of division however to aid them with their workings they may wish to write down the multiplication tables for the two digit number they are dividing by.	Dividing a 4 digit by a 2 digit will build from their understanding of short division from year 5. Explain that the method remains the same except we are now just looking for how many groups there are of the two digit number instead. Children should continue to work with numbers where there will be a remainder and express the remainder in the appropriate context e.g. as a remainder, a fraction or a decimal.

Year 6 Division (long)

National Curriculum Objective: 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

Vocabulary: sharing, grouping, exchanging

Concrete / Pictorial	Abstract
	432 ÷ 15 becomes  432 ÷ 15 becomes 
When dividing 4 digits by 2 digits with long division, written methods become most accurate as concrete and pictorial representations become less effective.	Children divide by a 2 digit number using long division. Writing out the multiples can support their calculations and help with remainders. Children should continue to work with numbers where there will be a remainder and express the remainder in the appropriate context e.g. as a remainder, a fraction or a decimal.

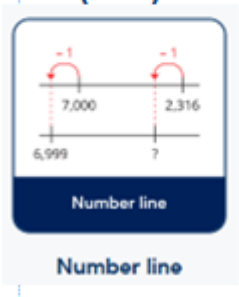
Rounding

Progression in rounding

Children are first exposed to rounding in year 4. They do however explore 'estimating' in year 3. National Curriculum objectives explore whole and decimal numbers.

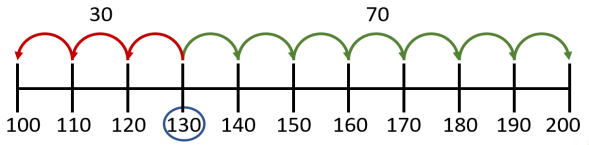
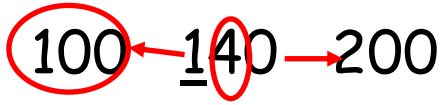
Year 4	Year 5	Year 6
round any number to the nearest 10, 100 or 1 000	round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000	round any whole number to a required degree of accuracy
round decimals with one decimal place to the nearest whole number (copied from Fractions)	*round decimals with two decimal places to the nearest whole number and to one decimal place* (copied from Fractions)	*solve problems which require answers to be rounded to specified degrees of accuracy* (copied from Fractions)

Whiterose digital tool: (click)



Vocabulary.

Closest, nearest, up, down, column, digit, place value.

Pictorial	Abstract
Round 130 to the nearest 100  130 is closer to 100 than 200 130 rounded to the nearest 100 is 100	Round 140 to the nearest 100 
Rounding should be introduced using a number-line. Children should first understand the concept relates to deciding what the number being rounding is closest to. Identify the numbers either side of the number being rounded should be emphasizes. For example, 100 and 200 are either side of 130	The method children should be shown is illustrated above. First children underline the digit they are round to. They then find the multiple before or after the number. Then circle the next digit. Children then decide whether to round up or down depending on whether the digit is 4 or less or 5 or more. Explain that the digit that was circled will either stay the same or go up.