



Calculation Policy

2019

'The answer is just the beginning'

Our Vision

Pearl Hyde is a community school where learning is accessible to all pupils. All teachers at Pearl Hyde ensure that children know that learning is collaborative and there is no limit to what they can achieve

In Maths, we use a mastery approach that enables all pupils to have ownership and progress in their learning, while meeting the aims of the maths curriculum.

- 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

A mastery approach to the curriculum ensures that children have a complete understanding of the maths curriculum by enabling children to learn and know their fundamental mathematical facts and how to apply them in multiple ways. This may be through more in depth and complex problems; cross-curricular learning or using different models and methods to answer questions in a variety of ways. Children in all year groups will have access to concrete and pictorial resources to help when working with the abstract context.

Planning

We believe that the key to success with all learners is quality first teaching. Each year a long term and medium-term plan is created to match the needs and the context of the cohort of children in the year group at the time. These plans are created using the White Rose Long and Medium-Term plans for guidance, meaning that the areas for learning in Maths are delivered in blocks. Year 2 and 6 may differ from this when collecting evidence for statutory assessments. The objectives from the national curriculum are then matched to the chapters in the Maths No Problem textbook. This high-quality textbook is used to support teachers in the breaking down the learning into small, coherent steps and to support them in making decisions about the most appropriate models and images.

In Early Years Foundation Stage, planning will be in line with the new framework and follow a block learning approach. As there is no recommended mastery approach for Early Years at the moment, provision will be similar to that of previous years and will be changed and adapted when necessary.

Lessons are planned directly onto Active Primary flipcharts which are saved together with other resources centrally. This allows for the Maths Lead and SLT to monitor the planning of Maths easily when reviewing the quality of teaching and learning during the school year. Each lesson in every year group is focussed around the concrete, pictorial and abstract approach as children learn new concepts. Teachers skilfully highlight connections between mathematical topics and support the learning of mathematical vocabulary.

Across all year groups, while most lessons will loosely follow the Maths No Problem textbooks, they will be supported by many other mathematical resources to enhance the children's opportunities to access problem solving. These resources include White Rose Reasoning and Problem Solving questions, I-See Reasoning questions, Testbase and Nrich activities. Other lessons will be based on an Active Maths approach to learning and teacher's expert knowledge of what has worked well in previous years.

Learning objectives can be found on the first page of the flipcharts but this is not shared with the children to encourage them to think carefully about anchor tasks and what they are learning.

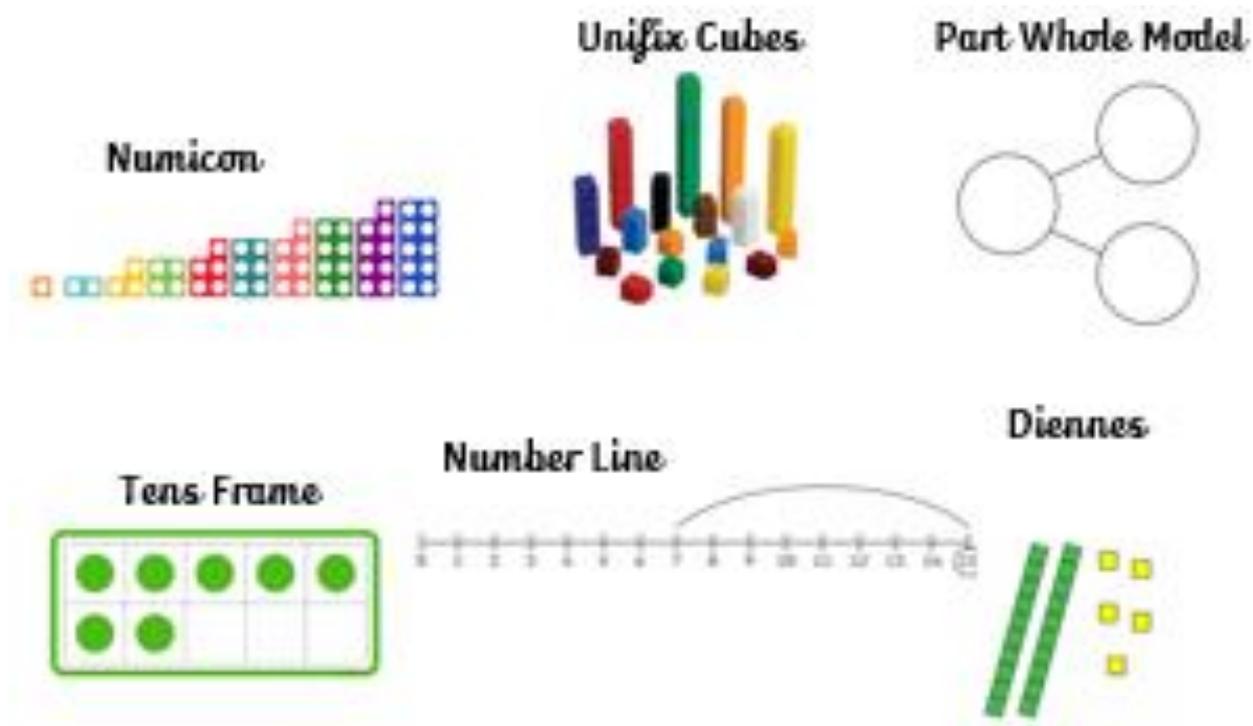
Early Years Foundation Stage

As children begin their school journey, they will focus on becoming familiar with the value of a number and how they can see maths in the world around them. The National Centre for Excellence in the Teaching of Mathematics has identified six main areas that collectively underpin children's early mathematical learning. These six areas provide the firm foundations for the maths that children will encounter as they go up the years in primary school. The six main areas are:

- Cardinality and Counting
- Comparison
- Composition
- Pattern
- Shape and Space
- Measures

During Early Years Foundation Stage, children will be taught Maths through a variety of teacher and child-led activities and be exposed to all areas of Maths throughout the Early Years learning environment. Number Blocks will be used to specifically support the teaching and learning of Cardinality and Counting

Children will also be introduced to mathematic models that will support their learning throughout their Maths journey at Pearl Hyde. These include:



Lesson Structure and Classroom Environment

The main teaching activity should be whole-class based with everyone covering the same content. Children are taught in classes, not setting groups in line with the mastery approach. Lessons are structured around the CPA approach providing opportunities throughout for using mathematical vocabulary, developing mathematical thinking and using multiple representations. In lessons where recording is required children are encouraged to record their answers in different ways. The types of questioning used throughout the lessons allow for assessment opportunities throughout. This provides opportunities to evaluate what has been learnt, review success and address misconceptions.

There are no specific time limits for the different parts of a lesson. The aim of a mathematics lesson is to teach a child a skill or strategy that will provide a solution to a task. It is not simply to produce a page of correct number work, which is abstract to any real-life situation. Although Maths is taught as a discrete subject, teachers are encouraged to exploit any cross-curricular links and provide opportunities for children to demonstrate their mastery of concepts or skills in other subjects (eg: science, ICT, PE, topic).

It is the responsibility of teaching assistants supporting individuals or groups of children within a maths lesson to ensure they have seen the flipchart and discussed it with the class teacher and prepared any required resources. They are expected to provide feedback to the teacher on a daily basis for the children they have been working with. This feedback may be verbal or if preferred, written on 'post-it' notes. Learning in books is presented and marked in accordance with guidance in the marking policy.

The classroom environment should be mathematically rich and support current learning. Maths working walls will be built throughout a unit and used daily as a part of the maths lesson. They must be clearly visible. Key vocabulary, reference to the models and images that the children have been working with during the lesson and/or unit, links and sentence stems should all be included.

Number Bonds and

Multiplication Tables

During Fluency sessions, teachers will focus on teaching children their key skills. Each week the teacher will choose a different focus for the children to practise. This may be learning a new key skill or practising one they have learnt previously. From Reception to Year 6, teachers will be testing the children on specific key skills each week to enable children to achieve mastery in these areas. Every child will know which key skill is their focus of learning to allow them to have ownership of this. When a child achieves mastery in their key skill, they will receive a badge. These badges are for the children to keep and wear on their school uniform with pride. Below is a table that shows which year groups will learn which key skills.

Fluency sessions may be taught in many different ways. This may be through videos such as BBC Supermovers, using the counting stick or using flash cards with the children. The methods chosen to teach these skills will be determined by each individual teacher.

Year Group	Teaching and Learning	Focus for checking and practice
Reception	Counting in 10s and 2s Counting in 5s Number Bonds to 10	Counting in 1s
Year 1	2,5 and 10 times tables Number bonds to 20	Counting in 2s, 5s and 10s Number bounds to 10
Year 2	3,4 and 8 times tables	2,5 and 10 times tables Number bonds to 20
Year 3	6 and 7 times tables	3,4 and 8 times tables
Year 4	9, 11 and 12 times tables	6 and 7 times tables
Year 5	All times tables to 12 x 12 checked, practised thoroughly and applied	
Year 6		

Homework

Maths homework is provided for children half-termly. Children will be asked to complete one piece of Maths homework from this sheet. For example, using a recipe when cooking or estimating change from shopping. Teachers will expect children to be practising fundamental mathematical skills at home regularly. These skills include times tables, number bonds, halving and doubling. We therefore encourage the children to practice such skills daily at home; this could be completed using 'BBC Supermovers' and Make 10 top of the class. When required individual teachers may decide to set children extra homework to further their learning.

Special Educational Needs **and Quick Graspers**

We aim to provide a rich mathematical education, which will develop the potential of all pupils.

Children who are significantly below the expected standard for Maths in their year group will be planned for and assessed separately to other children. Therefore, their learning journey in Maths will be a more targeted approach for each individual's needs; this is so all children can achieve and make progress. However, some of the Maths No Problem activities will be suitable for ALL children to access.

Children who regularly grasp concepts rapidly and have been assessed as having mastered objectives from their year group may be identified by their class teacher as Gifted and Talented. Planning for these pupils will focus on enrichment prior to acceleration and the development of mathematical thinking rather than covering content more quickly. This will be through challenging and stimulating problems that may be linked to real-life contexts and probing questions

Growth Mindset

Throughout all the Maths lessons at Pearl Hyde, the children are encouraged to have a growth mindset. By teaching children that they can learn, change and develop the skills that they need to overcome a challenge and are better equipped to handle setbacks. The features of a growth mindset for Maths are:

- Believing you can learn mathematics to the highest levels
- Understanding that mistakes are valuable
- Knowing that asking and answering questions is important
- Understanding that mathematics is about creativity, pattern spotting and sense making
- ☑ Knowing that communication and making connections are vital components of mathematics
- ☑ Knowing that in a mathematics classroom the focus is not on performing or giving quick answers
- ☑ Understanding that a depth of knowledge is more important than speed



Long - Term Planning Examples



Year 1



Year 1	Autumn	Spring	Summer
Week 1	Number: Place Value (Within 10)	Number: Addition & Subtraction (Within 20)	Number: Multiplication & Division (Reinforce multiples of 2, 5 & 10)
Week 2			
Week 3	Number: Addition & Subtraction (Within 10)	Number: Place Value (Within 10) (Multiples of 2, 5 & 10 to be included)	Half Term
Week 4			Fractions
Week 5			Half Term
Week 6			Half Term
Week 7	Geometry: Shape	Measurement: Length & Height	Number: Place Value (Within 10)
Week 8			Measurement: Money
Week 9			Measurement: Time
Week 10	Number: Place Value (Within 20)	Measurement: Weight & Volume	Summer
Week 11			
Week 12	Geometry: Position, Direction & Space	Geometry: Shape Patterns & Sorting	Easter
Week 13		Consolidation	
Week 14		Xmas	
Week 15			
Week 16			

Year 2

Summer	Spring	Autumn	Year 2
Problem Solving & Efficient Methods	Measurement: Length, Height, Mass, Capacity & Temperature	Number: Place Value	Week 1
			Week 2
Week 3			
SATS	Statistics	Number: Addition & Subtraction	Week 4
Half Term	Fractions		Week 5
Geometry: Position & Direction			Week 6
			Week 7
Consolidation: Addition & Subtraction (Number bonds, doubles etc)	Half Term	Half Term	Week 8
Consolidation: Multiplication & Division Facts	Geometry: Properties of Shape	Measurement: Money	Week 9
			Week 10
Investigations		Measurement: Time (Include half, quarter and full turns)	Number: Multiplication & Division
	Week 12		
	Week 13		
Summer	Easter	Consolidation	Week 14
		Xmas	Week 15
			Week 16

Year 3

Year 3	Autumn	Spring	Summer	
Week 1	Number: Place Value	Money	Measurement: Time	
Week 2		Statistics		
Week 3	Number: Addition & Subtraction	Measurement: Length	Angles, Lines, Shape	
Week 4				
Week 5		Measurement: Perimeter	Half Term	
Week 6		Fractions	Geometry: Angles, Lines and Shape	
Week 7				
Week 8		Half Term	Half Term	Measurement: Mass
Week 9		Number: Multiplication & Division	Fractions	Capacity
Week 10	2 x weeks for flexibility and assessments etc.			
Week 11				
Week 12				
Week 13				
Week 14	Time	Summer Holidays		
Week 15	Measurement Money	Easter		
Week 16				

Year 4

Summer	Spring	Autumn	Year 4
Money	Fractions	Number: Place Value	Week 1
Perimeter and Area			Week 2
			Week 3
Half Term	Decimals	Number: Addition & Subtraction	Week 4
Perimeter and Area			Week 5
Consolidation: Addition & Subtraction (Number bonds, doubles etc)			Week 6
		Measurement: Length	Week 7
		Half Term	Half Term
Consolidation: Multiplication & Division Facts	Geometry: Properties of Shape and Position and Direction	Measurement: Money	Week 9
		Number: Multiplication & Division	Week 10
			Week 11
Investigations	Measurement: Money	Number: Multiplication & Division	Week 12
			Week 13
Summer	Measurement: Money	Number: Multiplication & Division	Week 14
			Week 15
	Easter	Statistics	Week 16

Year 5

Summer	Spring	Autumn	Year 5
Volume	Fractions	Number: Place Value (Within 10)	Week 1
	Decimals		Week 2
		Number: Addition & Subtraction (Within 10)	Week 3
Week 4			
Match SATS		Half Term	Week 5
Roman Numerals	Week 6		
Measurement and Conversion	Percentages	Multiplication and Division	Week 7
	Half Term		Half Term
	Statistics	Geometry: Shape	Division
Geometry: Position and Direction		Fractions	Week 10
			Week 11
Area and Perimeter	Summer		Week 12
			Week 13
Summer	Easter	<u>Dol-y-Moch</u>	Week 14
		Xmas	Week 15
			Week 16

Year 6

Summer	Spring	Autumn	Year 6
TARGETED SATS PREP	Percentages	Number: Place Value (Within 10)	Week 1
	Ratio		Week 2
SATS	Area, Perimeter and Volume	Number: Four Operations	Week 3
Fiver Challenge	Geometry		Week 4
Half Term	Algebra		Week 5
Fiver Challenge	Pie Charts	Fractions	Week 6
			Week 7
	Half Term	Half Term	Week 8
	TARGETED SATS PREP	Decimals	Week 9
			Week 10
Week 11			
Summer	Easter	Geometry: Position and Direction	Week 12
		Measurement	Week 13
		Assessment Week	Week 14
			Week 15
		Xmas	Week 16



Addition and Subtraction Routeway



Key Stage 1

Year 1

During Year 1, children will continue using informal methods shown to them in EYFS when approaching the mathematical challenges presented to them. The methods that they use throughout Year 1 are developed and will be used by the children throughout their school journey. In Year 1, all children will be given the opportunity to use the following models and equipment to help with their progression towards written calculations.

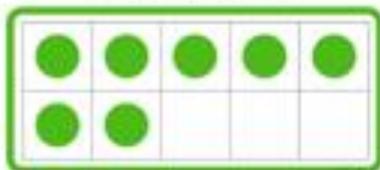
Numicon



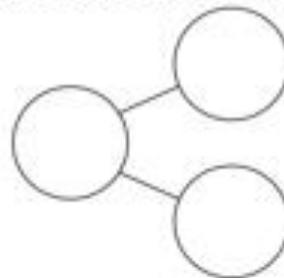
Unifix Cubes



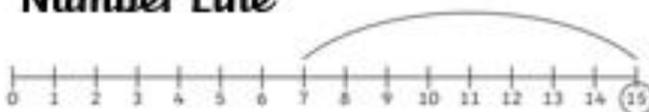
Tens Frame



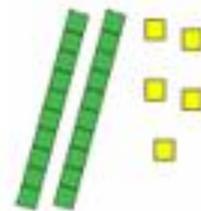
Part Whole Model



Number Line



Diennes



Year 2

In Year 2, children will continue to build upon and be introduced to more informal methods they can use to calculate. As children progress throughout the year, all children will be shown a formal written method for addition and subtraction. Children will have the opportunity to use this method once they are secure in their knowledge of place value. This will be determined by each individual class teacher. The following models will be shown and used by the children throughout Year 2.

Straws



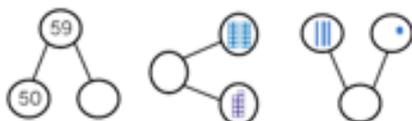
100 Square

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

Tens and Ones Chart

Tens	Ones
	2*

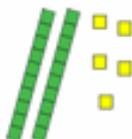
Part Whole Model



Number Line



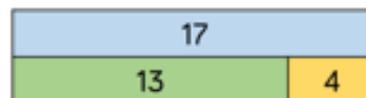
Diennes



Place Value Counters



Bar Model



NO EXCHANGES		Formal Methods	
$\begin{array}{r} 25 \\ + 3 \\ \hline 28 \end{array}$	$\begin{array}{r} 23 \\ + 40 \\ \hline 63 \end{array}$	$\begin{array}{r} 22 \\ + 17 \\ \hline 39 \end{array}$	
$\begin{array}{r} 37 \\ - 2 \\ \hline 35 \end{array}$	$\begin{array}{r} 36 \\ - 20 \\ \hline 16 \end{array}$	$\begin{array}{r} 37 \\ - 24 \\ \hline 13 \end{array}$	
EXCHANGES			
$\begin{array}{r} 15 \\ + 18 \\ \hline 13 \\ + 20 \\ \hline 33 \end{array}$	$\begin{array}{r} 1\cancel{2}13 \\ - 5 \\ \hline 18 \end{array}$	$\begin{array}{r} 2\cancel{3}12 \\ - 16 \\ \hline 16 \end{array}$	

Expanded

With practical equipment and drawing for support

Key Stage 2

Year 3

As children enter Year 3, they will continue to use the informal methods already taught to them; these methods will help to support the children as they progress through to using formal written calculations. Children will be shown and use the expanded calculation methods to ensure their place value is secure. All children will then be shown and use the compact method for addition and subtraction. All the methods that the children are shown can be used to support the children with their reasoning and problem solving.

NO EXCHANGES		Formal Methods			
2 1 3	+	4 0			2 5 3
2 4 3	-	4 0			2 0 3
2 1 3	+	7 4			2 8 7
6 5 8	-	4 2			6 1 6
5 6 0	+	2 3 4			7 9 4
7 9 4	-	1 3 2			6 6 2
1 EXCHANGE					
<i>Expanded - progress to compact if appropriate</i>					
1 7 6	+	4 0			6
1 1 0	+	1 0 0			2 1 6
1 7 6	+	4 0			2 1 6
1					
			4 3 5	+	2 1 7
			1 2		
			4 0		
			+ 6 0 0		
			6 5 2		
600	+	50	+	3	
- 20			+	8	
600	+	20	+	5	= 625
			6 ⁴ 5 ¹ 3	-	2 8
			6		
			6		
			6		
300	+	40	+	7	
- 100			+	20	
200	+	10	+	9	= 219
			3 ⁴ 4 ¹ 7	-	1 2 8
			3		
			3		
			3		

Year 3 Continued...

Formal Methods Continued....

MORE THAN 1 EXCHANGE

Expanded - progress to compact if appropriate

$$\begin{array}{r}
 679 \\
 + 73 \\
 \hline
 12 \\
 140 \\
 + 600 \\
 \hline
 752
 \end{array}$$

$$\begin{array}{r}
 679 \\
 + 73 \\
 \hline
 752 \\
 11
 \end{array}$$

$$\begin{array}{r}
 435 \\
 + 287 \\
 \hline
 12 \\
 110 \\
 + 600 \\
 \hline
 722
 \end{array}$$

$$\begin{array}{r}
 435 \\
 + 287 \\
 \hline
 722 \\
 11
 \end{array}$$

$$\begin{array}{r}
 300 \\
 \del{400} + \del{160} + \del{14} \\
 - \quad \quad 80 + 5 \\
 \hline
 300 + 80 + 9 = 389
 \end{array}$$

$$\begin{array}{r}
 3 \quad 16 \quad 14 \\
 \del{4} \quad \del{7} \quad 4 \\
 - \quad \quad 85 \\
 \hline
 389
 \end{array}$$

$$\begin{array}{r}
 500 \\
 \del{600} + \del{120} + \del{15} \\
 - 200 + 70 + 8 \\
 \hline
 400 + 50 + 7 = 457
 \end{array}$$

$$\begin{array}{r}
 5 \quad 12 \quad 1 \\
 \del{6} \quad \del{3} \quad 5 \\
 - 278 \\
 \hline
 457
 \end{array}$$

Subtraction - including 0

$$\begin{array}{r}
 500 \\
 \del{600} + \del{90} + \del{13} \\
 - 200 + 40 + 7 \\
 \hline
 300 + 50 + 6 = 457
 \end{array}$$

$$\begin{array}{r}
 5 \quad 9 \quad 1 \\
 \del{6} \quad \del{0} \quad 3 \\
 - 247 \\
 \hline
 356
 \end{array}$$

Year 4

Children will begin Year 4 continuing to use the expanded method for addition and subtraction; however this may only be for a short time. By the end of Year 4, children should be secure in the compact method for both addition and subtraction including when exchanges are being used. Children will still have access to informal methods of calculation to support them when they are reasoning and problem solving.

Formal Methods			
NO EXCHANGES			
$\begin{array}{r} 3251 \\ + 5413 \\ \hline 8664 \end{array}$	$\begin{array}{r} 5837 \\ - 1324 \\ \hline 4513 \end{array}$		
1 EXCHANGE			
$\begin{array}{r} 351 \\ 234 \\ + 423 \\ \hline 1008 \\ 1 \end{array}$	$\begin{array}{r} 3251 \\ + 5473 \\ \hline 8724 \\ 1 \end{array}$	$\begin{array}{r} 145134 \\ - 254 \\ \hline 1280 \end{array}$	$\begin{array}{r} 467167 \\ - 2392 \\ \hline 2375 \end{array}$
MORE THAN ONE EXCHANGE			
$\begin{array}{r} 355 \\ 234 \\ + 473 \\ \hline 1062 \\ 11 \end{array}$	$\begin{array}{r} 3758 \\ + 413 \\ \hline 4171 \\ 11 \end{array}$	$\begin{array}{r} 2938 \\ + 5473 \\ \hline 8411 \\ 111 \end{array}$	$\begin{array}{r} 8958 \\ + 5873 \\ \hline 14831 \\ 111 \end{array}$
$\begin{array}{r} 23145 \\ - 536 \\ \hline 2619 \end{array}$	$\begin{array}{r} 6715413 \\ - 3728 \\ \hline 3825 \end{array}$	$\begin{array}{r} 56121115 \\ - 1536 \\ \hline 4789 \end{array}$	
Including 0			
$\begin{array}{r} 5910143 \\ - 4781 \\ \hline 1262 \end{array}$			

Year 5

Throughout Year 5, children will focus more on formal written methods of addition and subtraction when they are calculating. Their learning will still be supported through the use of concrete and pictorial objects as well as the informal methods that they have been taught throughout previous year groups. These informal methods will be used to support children when they are working with a context.

Various Exchanges	Formal Methods	
$\begin{array}{r} 2318 \\ 925 \\ + \quad 53 \\ \hline 3296 \\ \hline 1 \quad 1 \end{array}$	$\begin{array}{r} 32461 \\ + \quad 4352 \\ \hline 36813 \\ \hline 1 \end{array}$	$\begin{array}{r} 37234 \\ + 75479 \\ \hline 112713 \\ \hline 1 \quad 1 \quad 1 \end{array}$
$\begin{array}{r} 560.83 \\ 23.14 \\ + \quad 46.71 \\ \hline 630.68 \\ \hline 1 \quad 1 \quad 1 \end{array}$	$\begin{array}{r} 7^4 \cancel{5}^1 3^5 \cancel{6}^1 \\ - \quad \quad 627 \\ \hline 74739 \end{array}$	$\begin{array}{r} 1^1 \cancel{2}^1 0^3 \cancel{4}^1 39 \\ - \quad \quad 5247 \\ \hline 15192 \end{array}$
$\begin{array}{r} 7^4 \cancel{8}^1 3^5 \cancel{6}^1 5 \\ - 32539 \\ \hline 42826 \end{array}$		

Year 6

By Year 6, children should be secure in their formal written method of calculation for addition and subtraction. Equipment will continue to be made available to children to support them in their understanding of mathematical concepts. Children will still be encouraged to use informal written methods to help them solve problems in a context.

Various Exchanges	Formal Methods	
$\begin{array}{r} 76259 \\ 68068 \\ + 7514 \\ \hline 151841 \\ \hline 2 \quad 1 \quad 2 \end{array}$	$\begin{array}{r} 67832 \\ + 5258 \\ \hline 73090 \\ \hline 1 \quad 1 \quad 1 \end{array}$	$\begin{array}{r} 34621 \\ + 35734 \\ \hline 60355 \\ \hline 1 \quad 1 \end{array}$
$\begin{array}{r} 387.300 \\ 43.190 \\ + 5.234 \\ \hline 435.724 \\ \hline 1 \quad 1 \quad 1 \end{array}$	$\begin{array}{r} \overset{3}{4}7\overset{5}{6}\overset{1}{1}\overset{2}{3}25 \\ - 938052 \\ \hline 3823273 \end{array}$	
$\begin{array}{r} \overset{7}{8}\overset{1}{3}\overset{3}{4}\overset{14}{5}\overset{9}{0}\overset{1}{1} \\ - 193642 \\ \hline 640858 \end{array}$	$\begin{array}{r} \overset{2}{3}\overset{1}{2}\overset{6}{7}\overset{14}{1}0 \\ - 62.63 \\ \hline 264.87 \end{array}$	$\begin{array}{r} \overset{5}{6}\overset{1}{4}\overset{4}{5}\overset{1}{2}7 \\ - 351.80 \\ \hline 293.47 \end{array}$



Multiplication and Division Routeway



Key Stage 1

Year 1

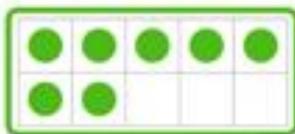
During Year 1, children will continue using informal methods shown to them in EYFS when approaching the mathematical challenges presented to them. The methods that they use throughout Year 1 are developed and will be used by the children throughout their school journey. In Year 1, all children will begin to understand multiplication and division through grouping and sharing small quantities, doubling numbers and quantities; finding simple fractions and count in twos, fives and tens.



100 Square

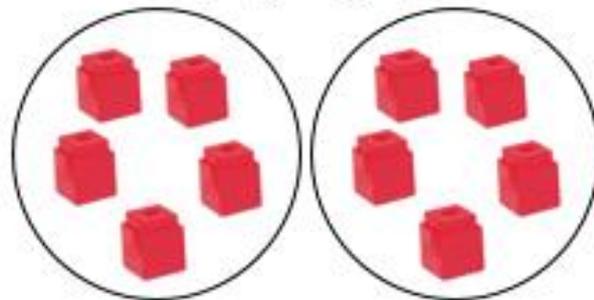
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Tens Frame

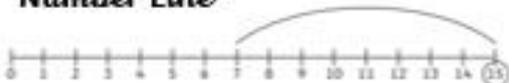


Sharing

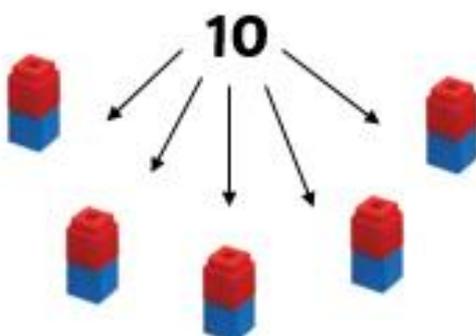
I have 10 cubes. Can you share them equally in 2 groups?



Number Line



Grouping



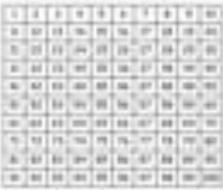
Year 2

In Year 2 children will be introduced to the multiplication and division symbol; however, they will still not use a formal written method to calculate answers to multiplication and division questions. They will continue to group and share equal groups and begin to work with unequal groups too. Children will continue to learn multiplication and division facts for their twos, fives and tens times table. These concepts will continue to be by the use of concrete materials.

Straws



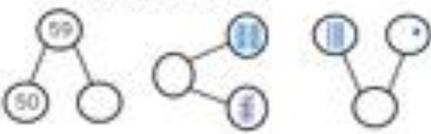
100 Square



Numicon



Part Whole Model



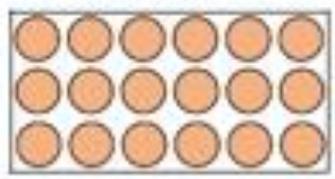
Number Line



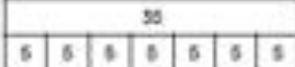
Diennes



Arrays



Bar Model



Equal Groups



Use of images



___ × ___ = ___

___ lots of 3 = ___

___ multiplied by ___ = 12

Unequal Groups

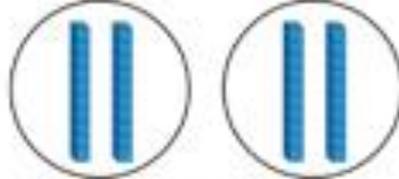


Grouping

Mrs Green has 18 sweets.
She puts 3 sweets in each bag.
How many bags can she fill?



Sharing



$40 \div 2 = 20$

Key Stage 2

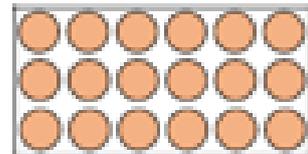
Year 3

During Year 3, children will be introduced to the first formal written methods that they will use. These formal methods will still be supported by the use of concrete materials to help the children to solve the calculations given to them. Children will also use these methods when solving problems in simple contexts.

Part-Whole Model



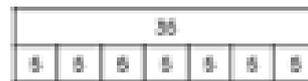
Arrays



Place Value Counters



Bar Model



MULTIPLICATION

Formal Methods - 2 digits by 1 digit

NO EXCHANGES

$$\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \\ + 60 \\ \hline 69 \end{array}$$

Expanded

1 EXCHANGE

$$\begin{array}{r} 47 \\ \times 4 \\ \hline 188 \\ + 160 \\ \hline 188 \end{array}$$

Expanded

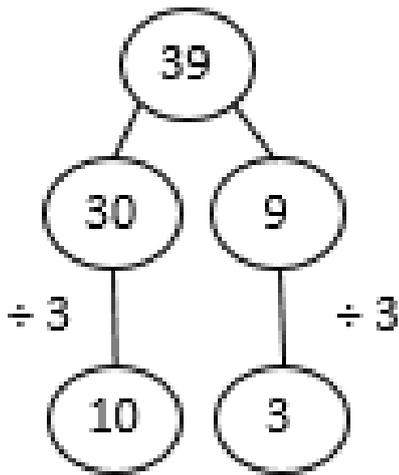
COMPACT

$$\begin{array}{r} 47 \\ \times 4 \\ \hline 188 \end{array}$$

Year 3 Continued

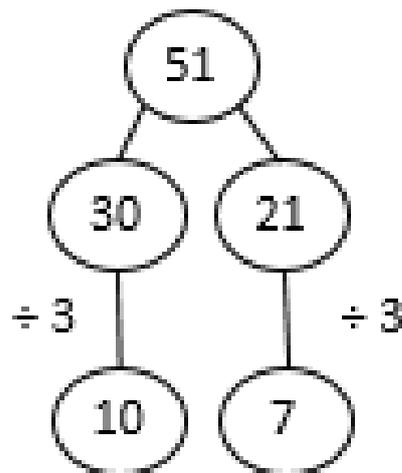
DIVISION

PARTITIONING



$$10 + 3 = 13$$

PARTITIONING USING MULTIPLES



$$10 + 7 = 17$$

NO EXCHANGES

$$\begin{array}{r} 13 \\ 3 \overline{) 39} \\ \underline{3} \\ 9 \\ \underline{9} \\ 0 \end{array}$$

Year 4

As children enter Year 4, they will continue to practise both compact multiplication and division. Children will also continue to use concrete and pictorial materials to support informal methods when solving problems in context. All children will continue to be shown the compact method however, teachers will use their own judgement if they feel children need more time on the expanded method.

MULTIPLICATION	Formal Methods - 2 digits by 1 digit and 3 digits by 1 digit
NO EXCHANGES	
$\begin{array}{r} 42 \\ \times 3 \\ \hline 126 \end{array}$	$\begin{array}{r} 112 \\ \times 4 \\ \hline 448 \end{array}$
1 EXCHANGE	
$\begin{array}{r} 36 \\ \times 4 \\ \hline 144 \\ 2 \end{array}$	$\begin{array}{r} 312 \\ \times 6 \\ \hline 1872 \\ 1 \end{array}$
2 EXCHANGES	
$\begin{array}{r} 273 \\ \times 7 \\ \hline 1911 \\ 52 \end{array}$	

Year 4 Continued

DIVISION

SHORT DIVISION

NO EXCHANGES

$$\begin{array}{r} 21 \\ 3 \overline{) 63} \end{array}$$

$$\begin{array}{r} 102 \\ 4 \overline{) 408} \end{array}$$

1 EXCHANGE

$$\begin{array}{r} 14 \\ 6 \overline{) 84} \end{array}$$

$$\begin{array}{r} 081 \\ 4 \overline{) 324} \end{array}$$

REMAINDERS

$$\begin{array}{r} 12 \text{ r}3 \\ 6 \overline{) 75} \end{array}$$

$$\begin{array}{r} 016 \\ 6 \overline{) 1040} \end{array}$$

Year 5

Throughout Year 5, children will continue to become secure in short multiplication. The children will continue to practice short division and be introduced to long multiplication and division during the year, Children will still be able to use informal methods to help solve problems in context.

SHORT MULTIPLICATION

$$\begin{array}{r} 2513 \\ \times \quad 7 \\ \hline 17591 \\ 3 \quad 2 \end{array}$$

Formal Methods

$$\begin{array}{r} 6579 \\ \times \quad 8 \\ \hline 52632 \\ 467 \end{array}$$

LONG MULTIPLICATION

$$\begin{array}{r} 27 \\ \times 34 \\ \hline 108 \\ 2 \\ + 810 \\ 2 \\ \hline 910 \end{array}$$

$$\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 12 \\ + 2480 \\ 3224 \\ 11 \end{array}$$

$$\begin{array}{r} 2374 \\ \times 32 \\ \hline 4748 \\ 1 \\ + 70220 \\ 121 \\ \hline 74968 \end{array}$$

Year 5 Continued

SHORT DIVISION

$$\begin{array}{r} 34 \\ 8 \overline{) 272} \end{array}$$

$$\begin{array}{r} 241 \\ 6 \overline{) 1446} \end{array}$$

$$\begin{array}{r} 1345 \\ 7 \overline{) 9435} \end{array}$$

$$\begin{array}{r} 46 \text{ r}7 \\ 9 \overline{) 426} \end{array}$$

LONG DIVISION

$$\begin{array}{r} 455 \\ 15 \overline{) 6825} \\ - 60 \\ \hline 7825 \\ - 75 \\ \hline 75 \\ - 75 \\ \hline \end{array}$$

Year 6

In Year 6, children will continue to practise all methods taught in previous years; they will continue to practise long division and learn how to multiply and divide decimals.

LONG MULTIPLICATION

$$\begin{array}{r} 6027 \\ \times \quad 34 \\ \hline 24108 \\ 12 \\ + 180810 \\ 2 \\ \hline 204918 \end{array}$$

Formal Methods

MULTIPLYING DECIMALS

$$\begin{array}{r} 8.7 \\ \times \quad 6 \\ \hline 52.2 \\ 4 \end{array}$$
$$\begin{array}{r} 8.68 \\ \times \quad 7 \\ \hline 60.76 \\ 4 5 \end{array}$$
$$\begin{array}{r} 784.9 \\ \times \quad 6 \\ \hline 4909.4 \\ 5 2 5 \end{array}$$
$$\begin{array}{r} 41.68 \\ \times \quad 7 \\ \hline 291.76 \\ 1 4 5 \end{array}$$
$$\begin{array}{r} 47.2 \\ \times \quad 62 \\ \hline 94.6 \\ 1 \\ + 2838.0 \\ 4 1 \\ \hline 2932.6 \\ 1 1 \end{array}$$
$$\begin{array}{r} 31.56 \\ \times \quad 32 \\ \hline 94.68 \\ 1 1 \\ + 631.20 \\ 1 1 \\ \hline 725.88 \\ 1 \end{array}$$

Year 6 Continued

LONG DIVISION

$$\begin{array}{r} 132 \\ 26 \overline{) 271432} \\ \underline{- 26} \\ 713 \\ \underline{- 78} \\ 52 \\ \underline{- 52} \\ 0 \end{array}$$

DIVIDING DECIMALS

$$\begin{array}{r} 57.26 \\ 6 \overline{) 343.156} \end{array}$$

$$\begin{array}{r} 26.4 \\ 15 \overline{) 396.0} \\ \underline{- 30} \\ 96 \\ \underline{- 90} \\ 6.0 \\ \underline{- 6.0} \\ 0 \end{array}$$