Exning Primary School

Mathematics Policy

Approved by:	SLT	**Date:**	11.3.2025
Last reviewed on:	March 2025		
Next review due by:	Spring 2028		

Exning Primary School

Mathematics Policy

Introduction

This policy outlines the teaching and organisation of the way in which mathematics is taught at Exning Primary School. We are a Mathematics Mastery Partnership school, and as such, we follow their programme of study from Reception to Year 6.

This calculation policy is set out in subjects: addition, subtraction, multiplication and division. Within each operation, there are modelled examples of CPA (concrete-pictorial-abstract) approaches. These examples are set out in year groups so that the progression in calculations are evident.

Aims

At Exning Primary School, it is our core belief that every child can be successful in their mathematics learning. We actively promote a 'growth mindset' approach to learning and encourage children to explore mathematics through a range of strategies.

"In mathematics, you know you've mastered something when you can apply it to a totally new problem in an unfamiliar situation."
Dr. Helen Drury, Director of Mathematics Mastery

1) We aim to ensure that every pupil has a deep understanding of their mathematics learning. Children should be able to represent their understanding in a number of different ways. We do this by making sure that our lessons involve modelling, and exploration of mathematical concepts through the use of concrete manipulatives, pictorial or abstract representations and through the use of talk tasks.

2) We aim to ensure that our pupils develop their mathematical thinking skills so that they are not just simply 'doing' maths. We do this by encouraging children to ask questions as well as answer them, to find patterns and to make connections in their work.

3) We aim to ensure that every child has a wide range of mathematical vocabulary that they can understand and use appropriately in their own reasoning. We do this by introducing key vocabulary at the start of every lesson, and through the use of talk tasks.

4) We aim to inspire our children to use their knowledge and skills to solve problems. Problem solving is woven through our curriculum as we believe that mastery takes place once a skill can be put to use in a completely new situation.

Teaching and Learning Style

All teachers undergo Mathematics Mastery training prior to joining our school. In school, we have online support from Mathematics Mastery specialists.

Each class has a daily mathematics lesson, which is structured as a 6-part lesson. A Do Now activity as a quick starter task, followed by the New Learning input. The New Learning is explored by children in a short Talk Task which is then consolidated and extended through a Develop Learning input. After this, the children receive a differentiated independent task. The lesson is finished with a short plenary activity. Teachers will carefully plan consolidation lessons to address any gaps in learning as and when required within, before and after Maths Mastery units based on formative and summative assessments.

On top of this daily lesson, each class is expected to have a 'Maths Fluency Session' at least 3 times a week. (These last 10 minutes in KS1 and 15 minutes in KS2). These are taught separately to the maths lesson and are an opportunity to further develop fluency in mathematical concepts being taught in class. In KS1 and year 4 and 5 these sessions use Mastery of Number sessions from NCETM.

Mastery in Mathematics Curriculum Planning
Teachers focus on the core skills in mathematics when they are planning their lessons and follow the Mathematics Mastery programme of study. This means that class teachers are teaching fewer topics throughout the school year as these are taught in greater depth. Prior assessment is used to inform and modify plans where necessary. Teachers also plan for fluency sessions, three times a week. These sessions will include one session in KS1 with the online programme 'Numbots' and one session in KS2 with the online programme 'Timestable Rockstars'. The Long Term Plans for each year group are available on the school website.

The Foundation Stage
NCETM sessions are taught daily in the Early Years. The focus is on the understanding of early number concepts and number sense. Children explore these aspects of mathematics through the use of concrete manipulatives. Children follow the last units of year from Mathematics Mastery to get them ready for year 1.
We give all children ample opportunity to develop their understanding of number, measurement, pattern, shape and space through varied activities that allow them to enjoy, explore, practise and talk confidently about mathematics.

Contributions to Mathematics to Teaching in Other Curriculum Areas
Cross curricular work provides a purposeful context for consolidating and extending children's skills and concepts in mathematics. Opportunities for problem solving, measurement, graphing, patterns and sequences can be found in many areas of the curriculum and cross curricular maths is displayed around school.

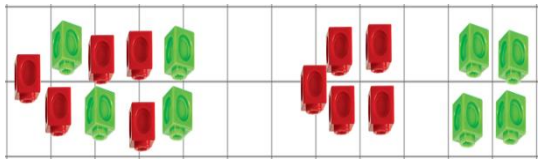
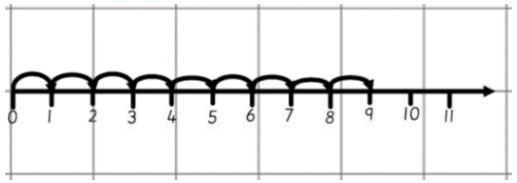
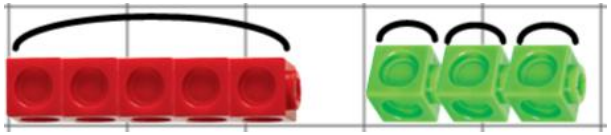
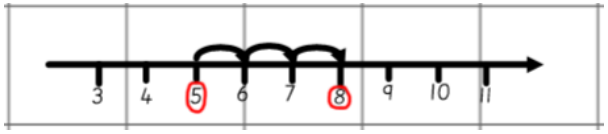
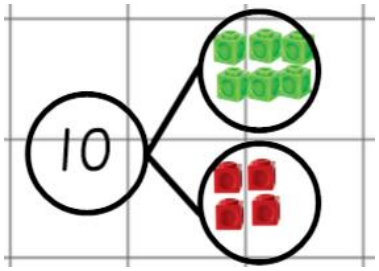
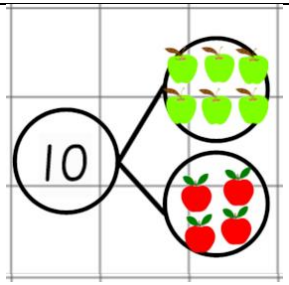
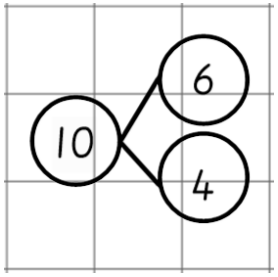
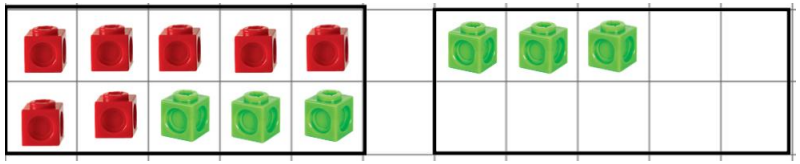
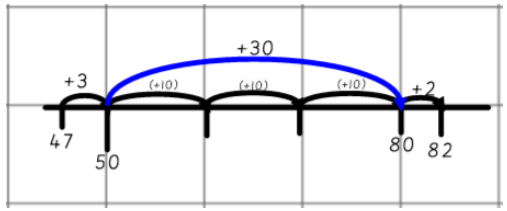
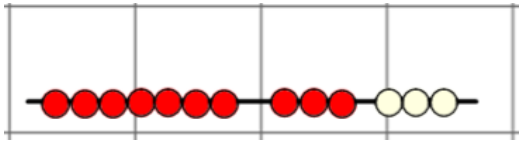
Teaching Mathematics to Children with Special Educational Needs
We teach mathematics to all children whatever their ability. It is part of the school curriculum policy to provide a broad and balanced education to all children. We provide learning opportunities that are matched to the needs of the children with learning difficulties and for those who are gifted and talented. Work in mathematics takes into account the targets set for individual children in Individual Education Plans (IEPs) or Individual Challenge Plans (ICPs). Interventions are used to target those children requiring extra support.

Assessment and Recording
We monitor children's progress and attainment through the use of Sonar. Formative assessment is made on a daily basis and teachers address misconceptions, in class, through the use of modelling and verbal feedback. If further support is needed, teachers will arrange for children to receive 1:1 or small group support. We also offer some informal interventions to further consolidate pupils' understanding and can offer pre-teaching of language or concepts, where appropriate. Ready to Progress (RTP) interventions are also used to help 'close the gap' with lower attaining pupils.
Summative assessments are made from half termly Mathematics Mastery assessments as well as an end of year assessment (An arithmetic and reasoning paper for each year group apart from Year 2 and Year 6). We use the Standard Assessment Tests (SATs) for children in year 2 and year 6.
Samples of a range of children's marked work are collected by the mathematics co-ordinator and kept in school for at least three years.

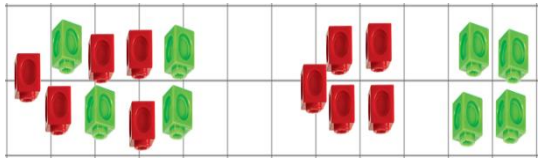
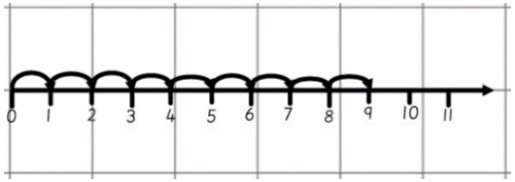
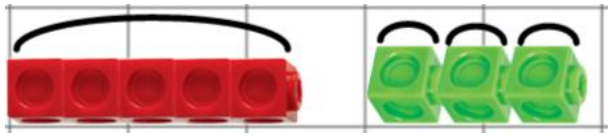
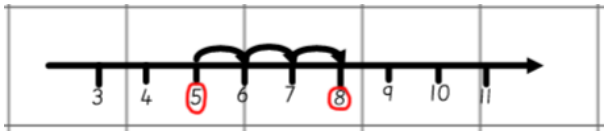
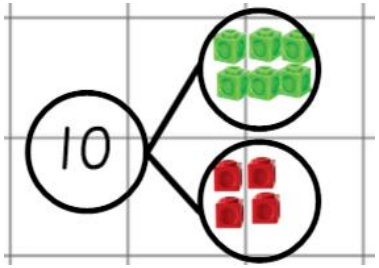
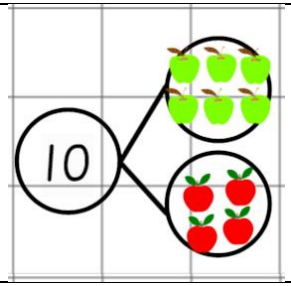
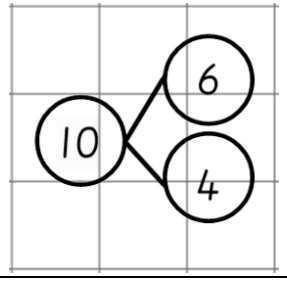
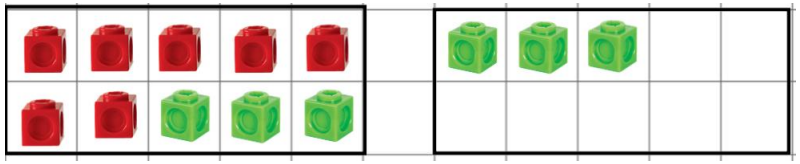
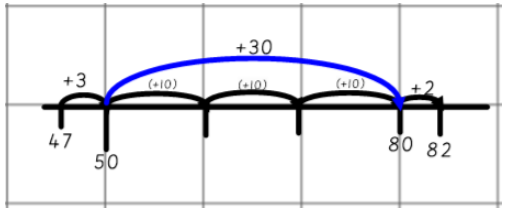
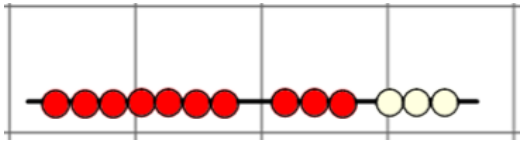
Monitoring, Evaluation and Review
Monitoring of the quality of teaching, assessment and planning in mathematics is the responsibility of the co-ordinator.
This is done by:

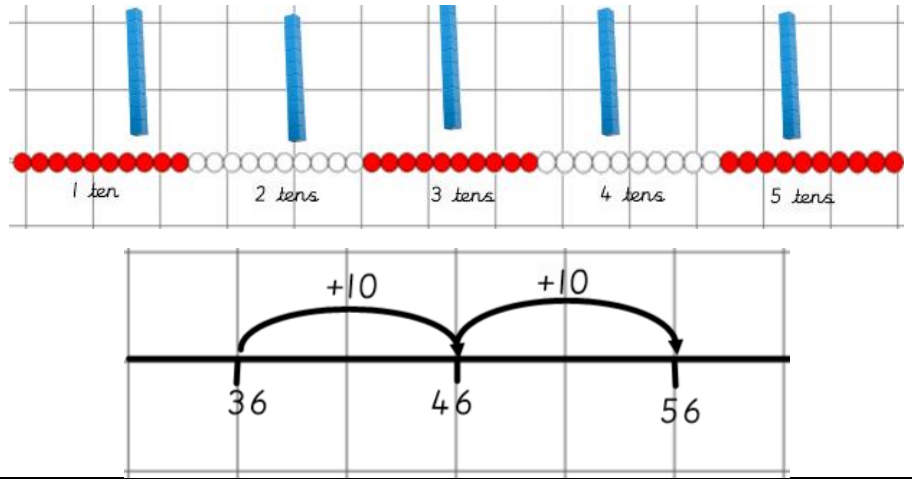
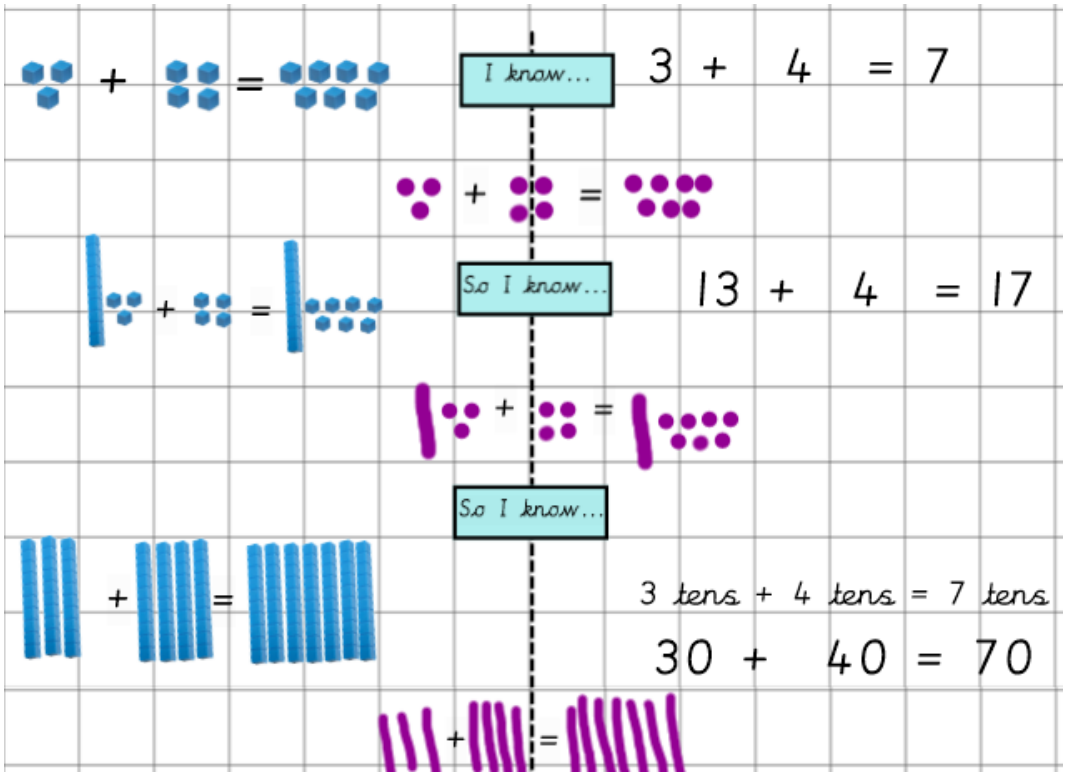
- Supporting colleagues in the teaching of Mathematics Mastery and Mastery of Number (NCETM)
- Being informed about current developments in mathematics and providing a strategic lead and direction for the subject in school
- Monitoring and evaluating of lessons – highlighting areas for further development
- Monitoring and evaluating the work in pupils' books – highlighting areas for further development
- Overseeing teachers' plans and assessments
- Arranging INSET where appropriate and heading staff meetings and PD days

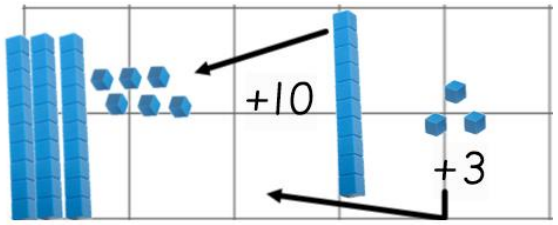
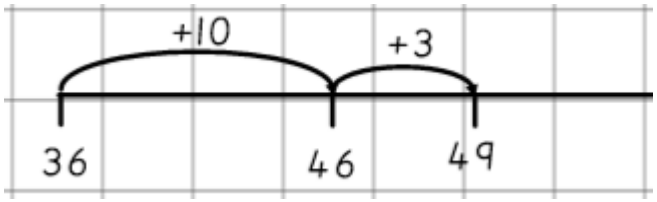
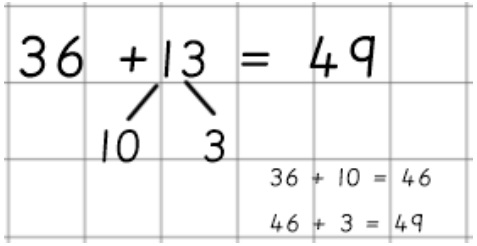
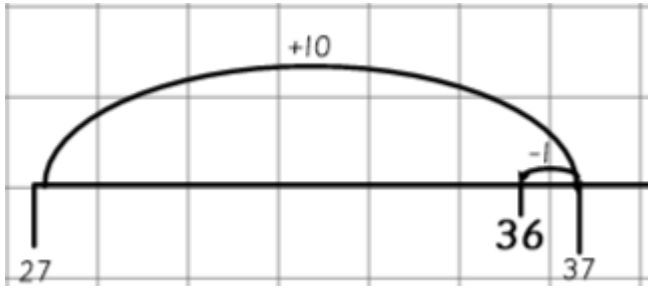
A mathematics governor is appointed to oversee the teaching of mathematics. This governor meets with the subject leader to review progress.

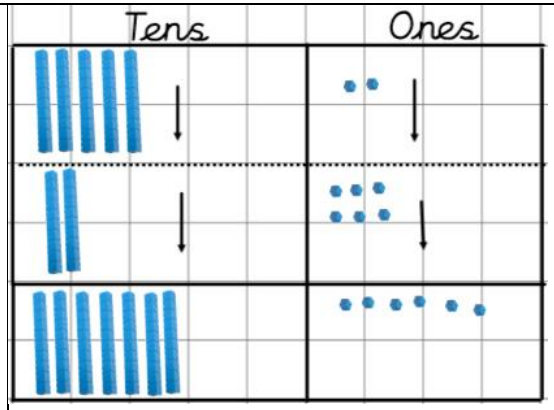
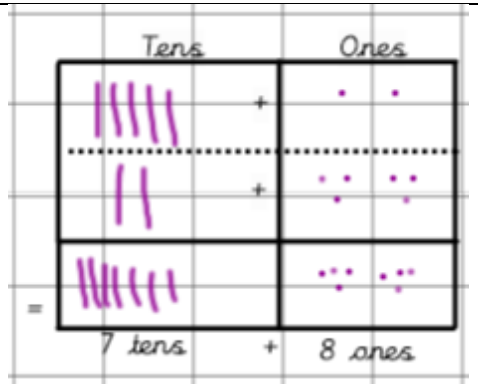
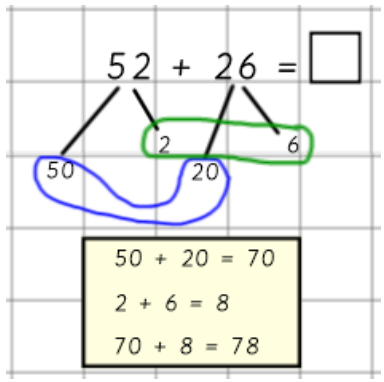
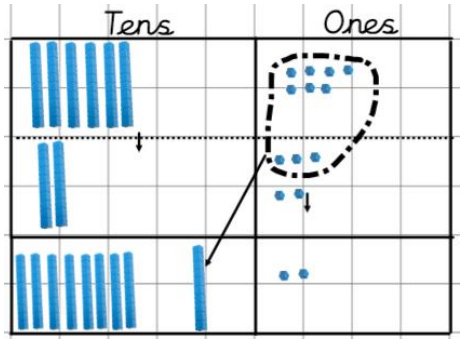
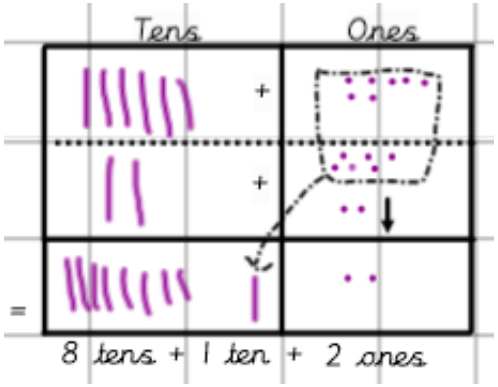
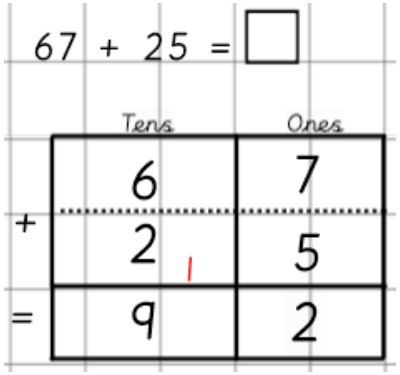
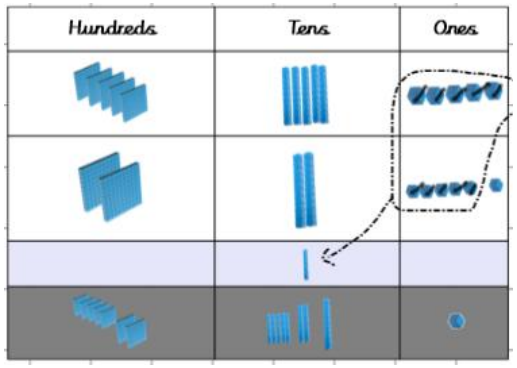
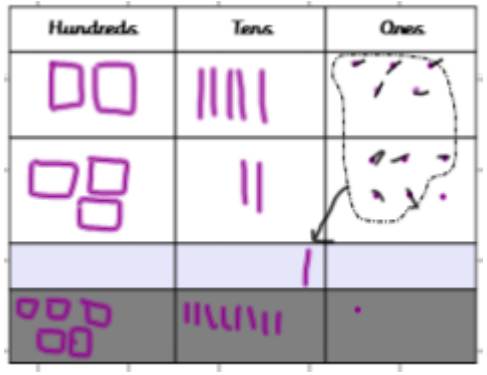
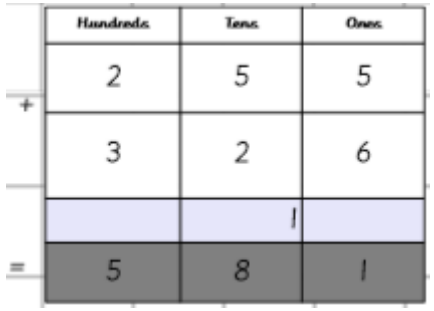
Year Group	Objective/ Strategy	Concrete	Pictorial	Abstract
1	**Count all objects**			4 + 5 = 9
1	**Counting on**			5 + 3 = 8
1 upwards	**Part-Whole** (This is used to teach both addition and subtraction alongside each other to help children's understanding of commutativity and the inverse relationship between addition & subtraction.			 6+ 4 = 10
1 upwards	**'Make Ten' strategy** (children are encouraged to start with the greater number and partition the smaller number to make ten). **Introduced in Year 1 but built upon in other year groups.*	  *string help to show*	 *(The colours on the bead how many more are needed to make 10).*	

Addition

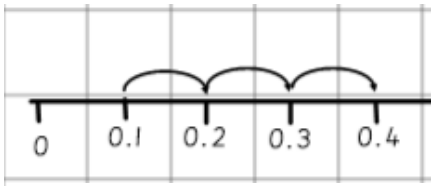
Year Group	Objective/ Strategy	Concrete	Pictorial	Abstract
1	**Count all objects**			4 + 5 = 9
1	**Counting on**			5 + 3 = 8
1 upwards	**Part-Whole** (This is used to teach both addition and subtraction alongside each other to help children's understanding of commutativity and the inverse relationship between addition & subtraction.			 6+ 4 = 10
1 upwards	**'Make Ten' strategy** (children are encouraged to start with the greater number and partition the smaller number to make ten). **Introduced in Year 1 but built upon in other year groups. Developed in Yr2/Yr3/Yr4*	 	*string help to show*	 *(The colours on the bead string help to show how many more are needed to make 10).*

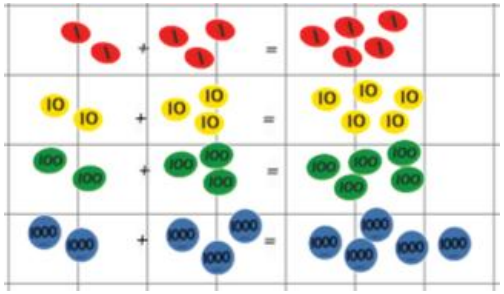
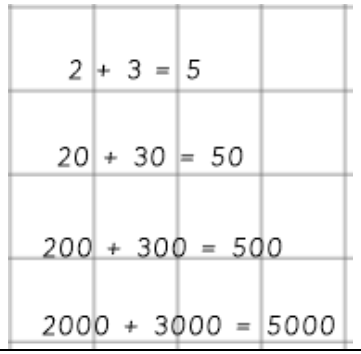
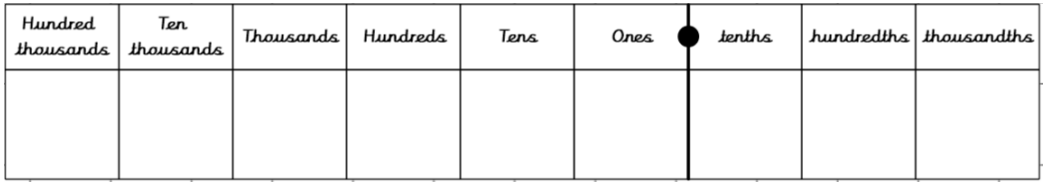
1 / 2	**Adding multiples of 10** **Count on in 10s and 100s**	
2	**Using related or 'known facts' to create derived facts.** *Explored further in KS2.*	

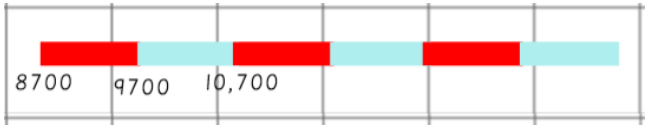
2	**Partition one number, then adding tens and ones**	  
2 upwards	**Round and Adjust** (compensating) This strategy is taught to help pupils understand that 'compensating' is more efficient than adding 10s and then the 1s. *Developed further in KS2 for greater numbers.*	  27 + 9 = 36 27 + 10 = 37 37-1 = 36

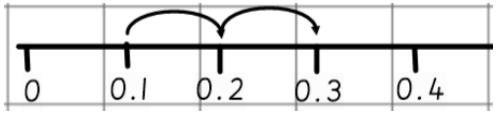
2	**Partitioning both parts, then adding the 10s and 1s** Taught as a mental strategy when no regrouping is required.			
1/2	**Column method** (no regrouping – Y1) (With regrouping – Y2)			
3/4	**Written Column Method** (With regrouping, up to 4-digit numbers)	 555 + 226 = 781	 255 + 326 = 581	 255 + 326 = 581

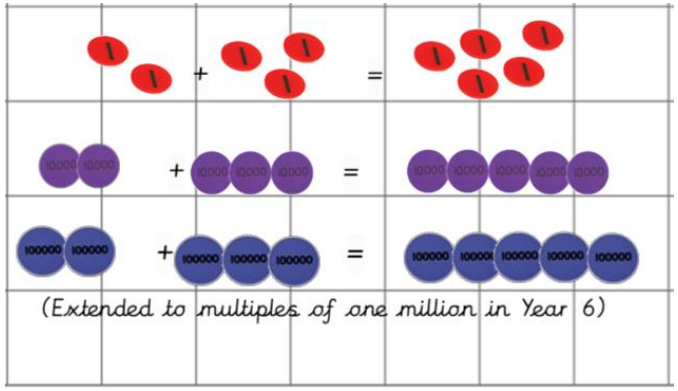
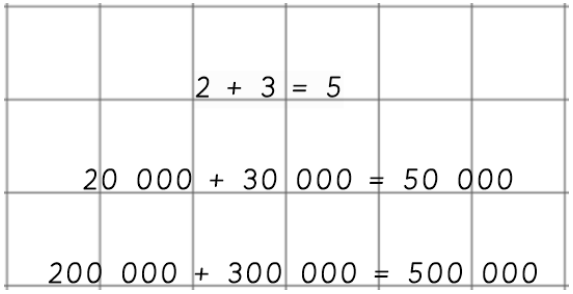
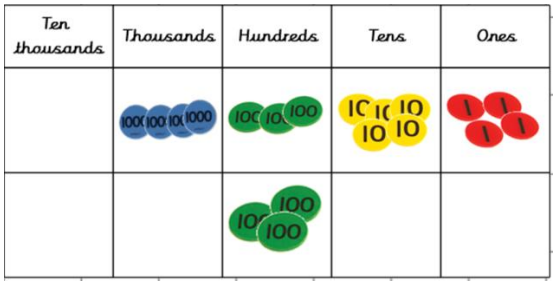
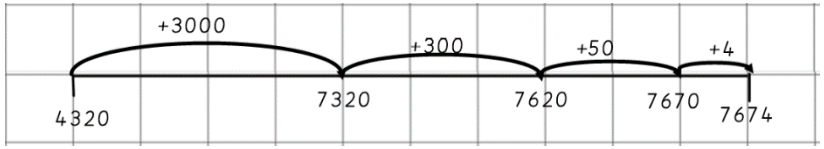
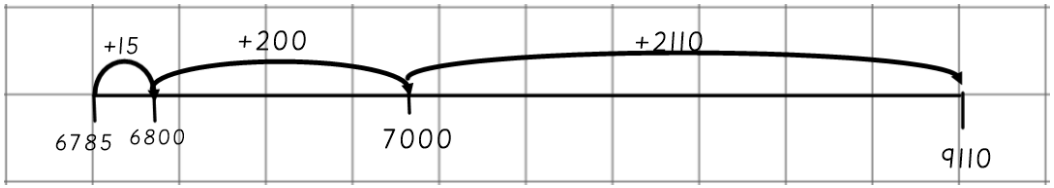
<table>
<tr><td>3/4</td><td>Count forwards/backwards in steps of 10, 100 and 1000 for any number up to 10,000.</td><td>This can be done with concrete manipulatives such as bead strings or Cuisenaire Rods (Where the value of each bead is greater than 1).
 

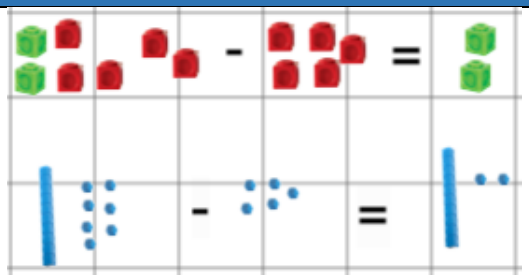
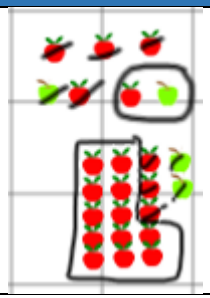
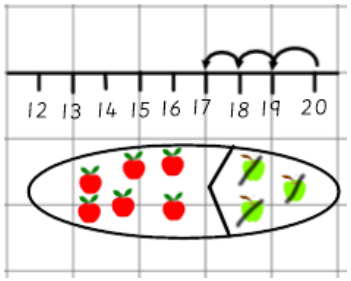
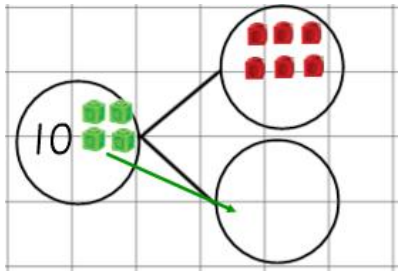
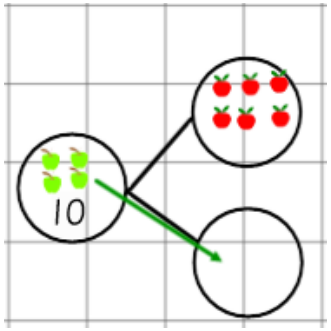


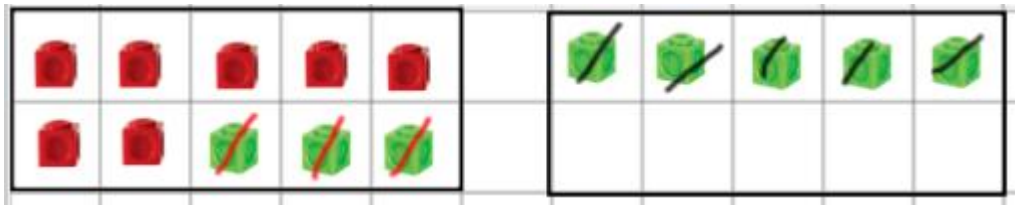
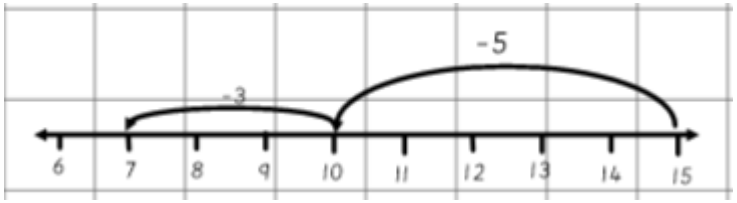
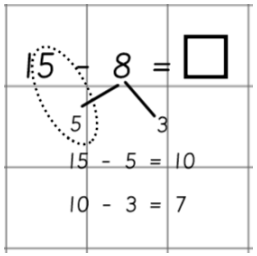
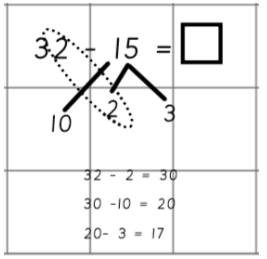
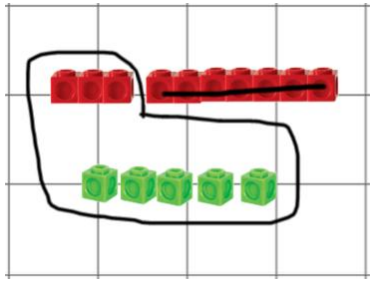
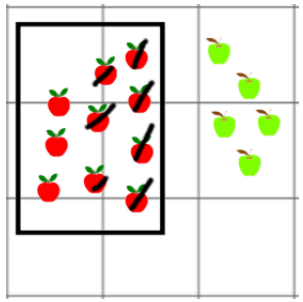
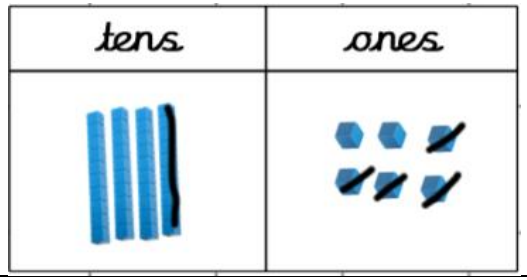
0.1 + 0.3 = 0.4</td></tr>
<tr><td>3/4</td><td>Using known facts and understanding of place value to derive facts.</td><td> 

</td></tr>
<tr><td>5/6</td><td colspan="2">The calculation strategies for addition used in Year 5 and Year 6 are broadly similar to, and build upon, the approaches modelled above.</td></tr>
<tr><td>5/6</td><td>Count forwards/backwards in steps of powers of 10 for any number up to 1,000,000.</td><td>Pupils are supported with place value counters on a place value chart. They repeatedly add the same counter and regroup as needed.
 

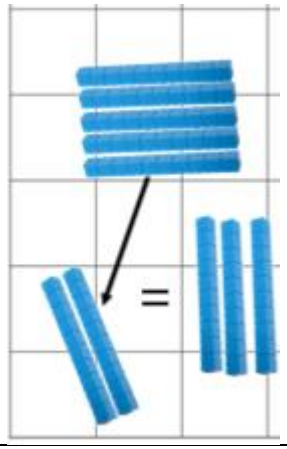
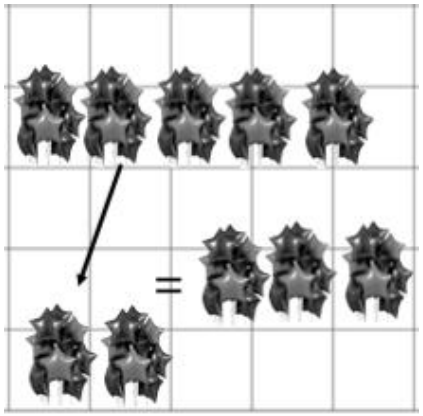
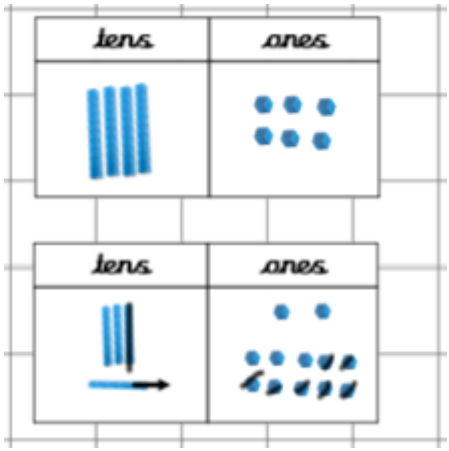
Pupils are also supported with counting sticks and number lines:
 

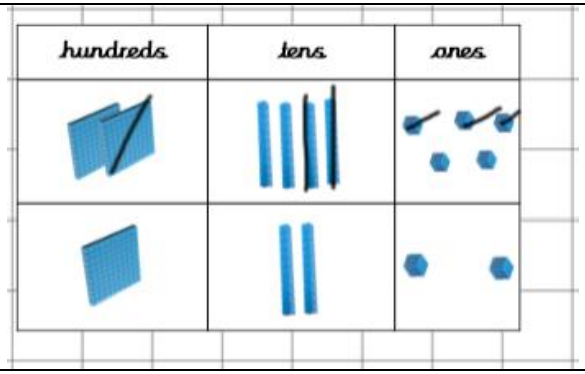
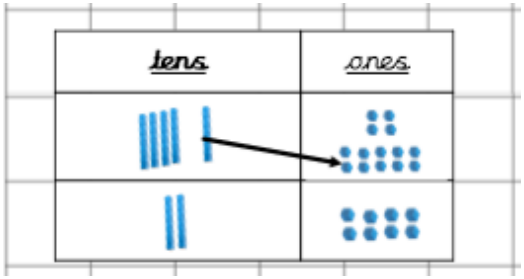
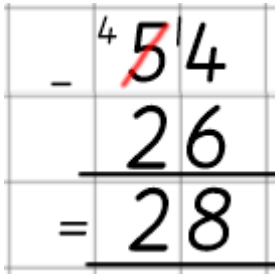
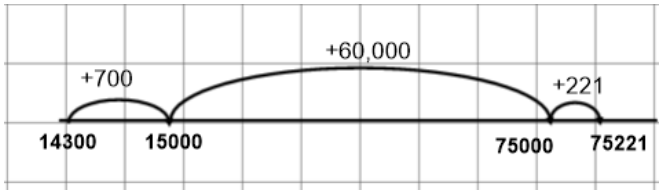
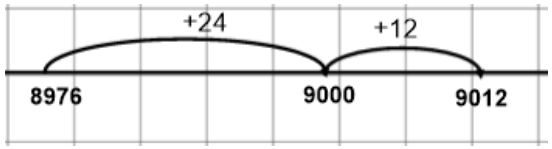

</td></tr>
</table>

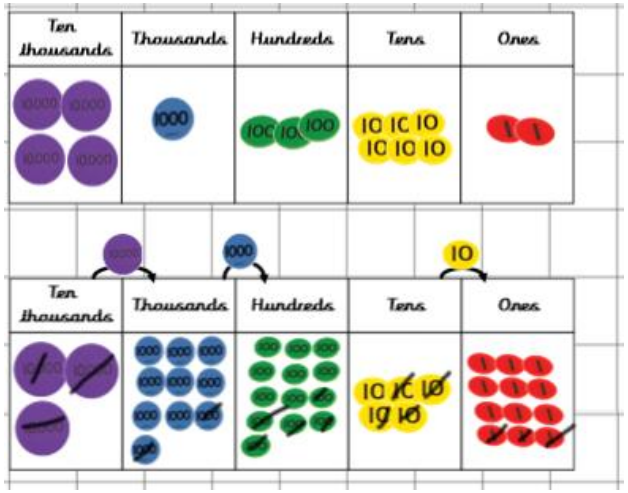
5/6	**Using known facts and understanding of place value to derive facts.**	 
5/6	**Partitioning into place value amounts. (Canonical partitioning).** *This strategy can be used as a mental strategy or with jottings as needed.*	 *Create the greater number with PV counters and then add each PV part of the other number. (This models the hundreds being added).* **3354 + 4320 = 4320 + 3000 + 300 + 50 + 4** 
5/6	**Partitioning in different ways. (Non-canonical partitioning).**	**Extend the 'Make Ten' strategy (See Y1/2 guidance) to count on to a multiple of ten. (This strategy can be applied to decimals).*  . **6785 + 2110 = ?**

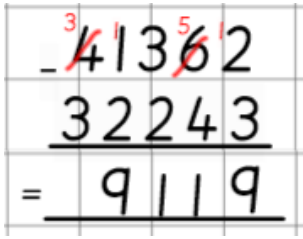
Year Group	Objective/ Strategy	Concrete	Pictorial	Abstract
1	Taking away from the ones.			7 – 5 = 2 17 – 5 = 12
1	Counting back			20-3=17 9 – 3 = 6
1/2	Part-Whole.			10-6 = 4

1/2	**'Make Ten' Strategy.** *(In Year 2 onwards, bead strings are used for greater numbers).*	   
1	**Taking away from the tens.**	  **15-7 = 8**
1/2	**Partitioning to subtract.** (No regrouping) (With regrouping)	  **46 -14 = 32**

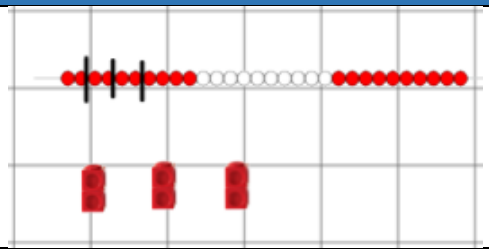
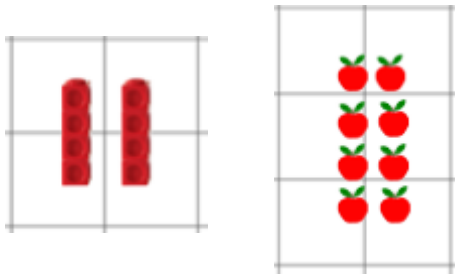
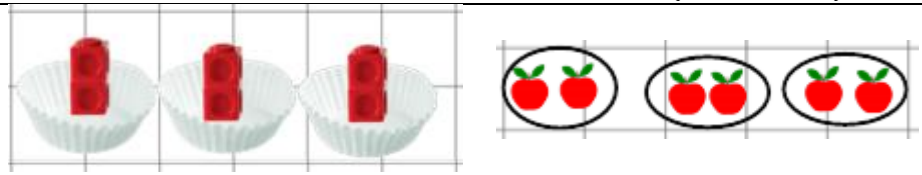
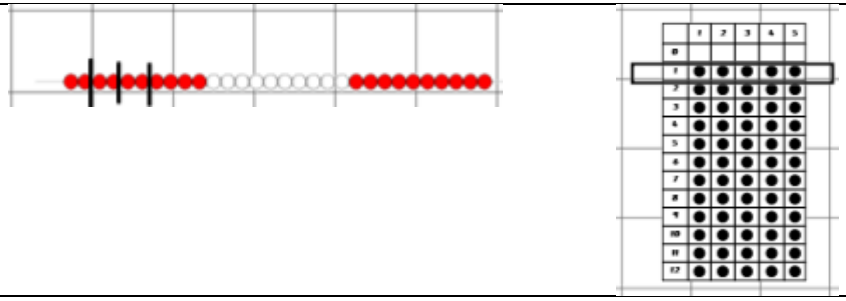
2	**Subtracting multiples of ten.**	  . **46 -14 = 32**
1	**Column method with regrouping.**	 **46 -14 = 32**

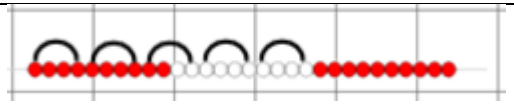
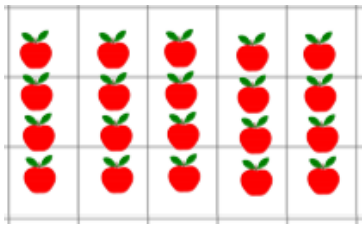
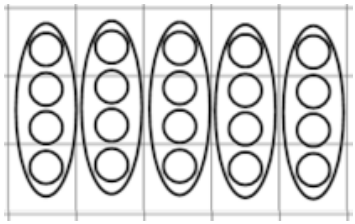
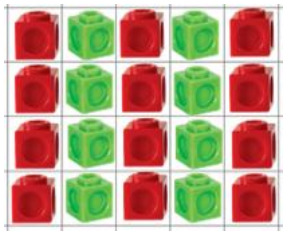
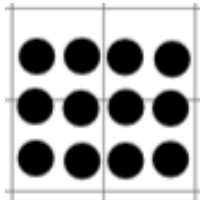
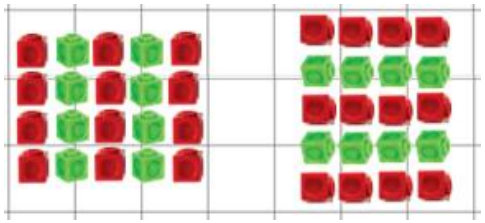
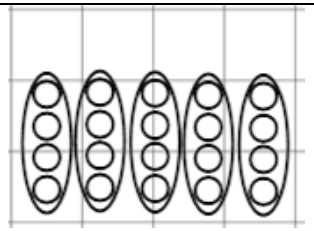
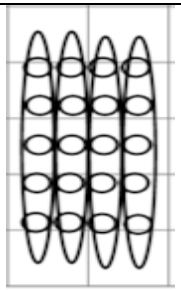
2	**Partitioning to subtract with no regrouping.**		**245 - 123 = 122**
2	**Column method with regrouping** *(Progressing to a written method)*		
Year 3 and Year 4 subtraction strategies are a reversal of the addition strategies modelled above.			
Year 5 and Year 6 subtraction strategies are a reversal of the addition strategies modelled above.			
5/6	**Calculate difference by 'counting on'.** *Pupils should understand that finding the difference is efficient when the numbers are close to each other.*	 	**75,221 – 14,300 = 60,921** **9012 – 8976 = 36**

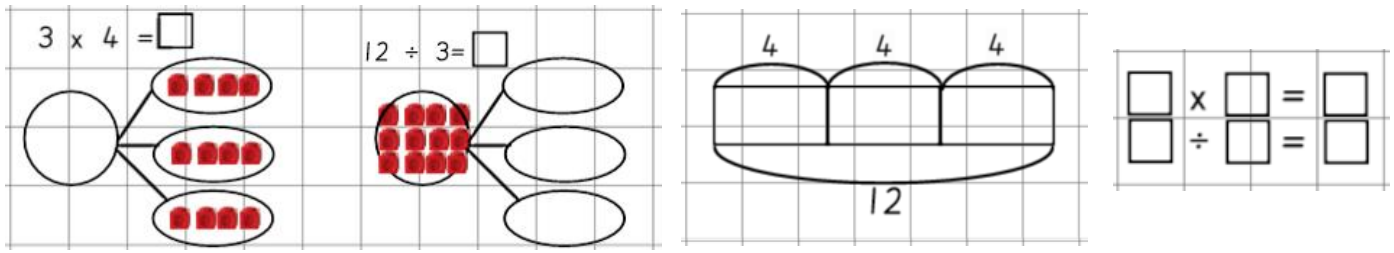
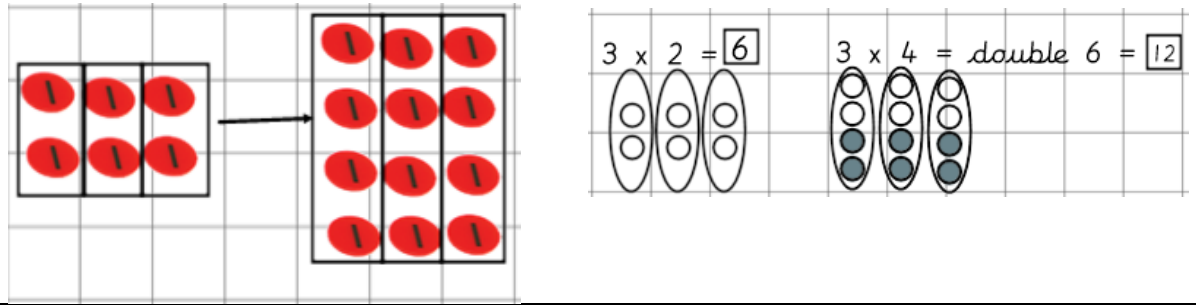
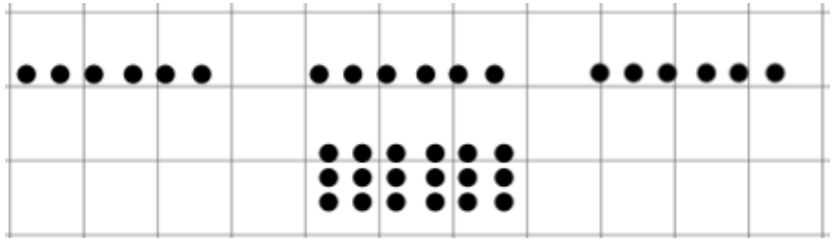
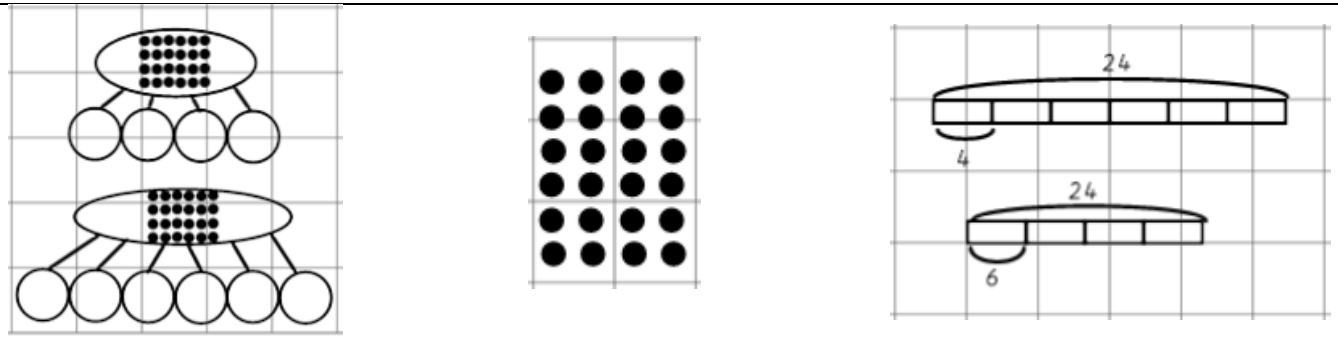
5/6	**Written column method.**	

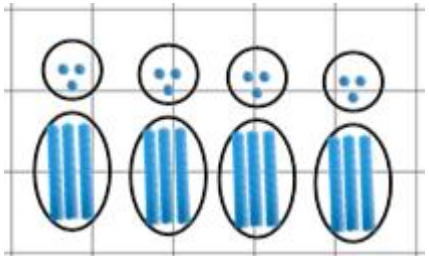
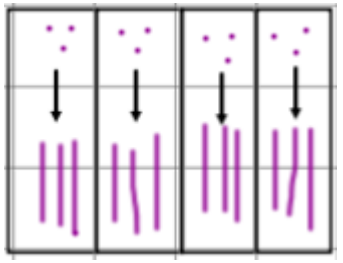
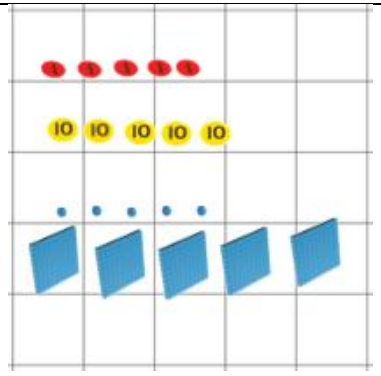
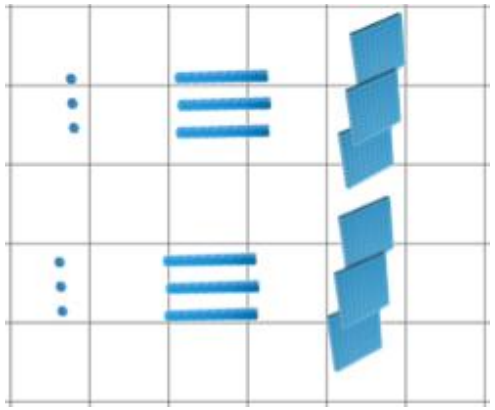


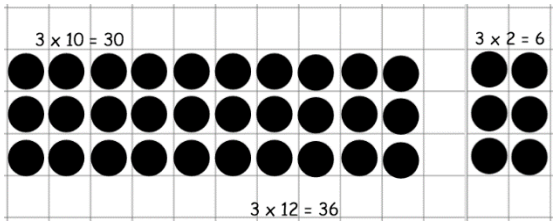
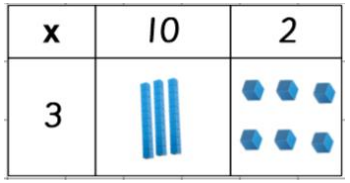
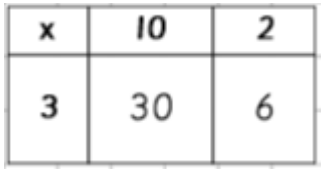
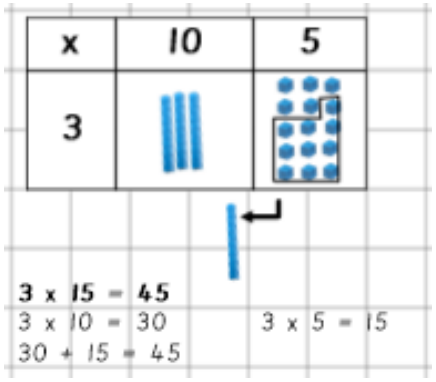
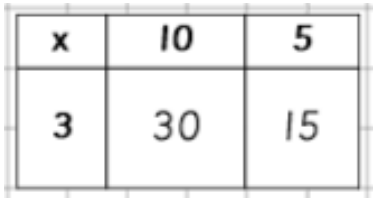
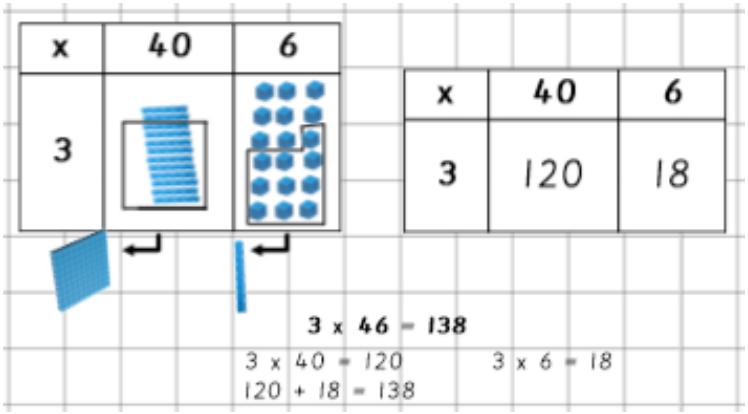
Multiplication

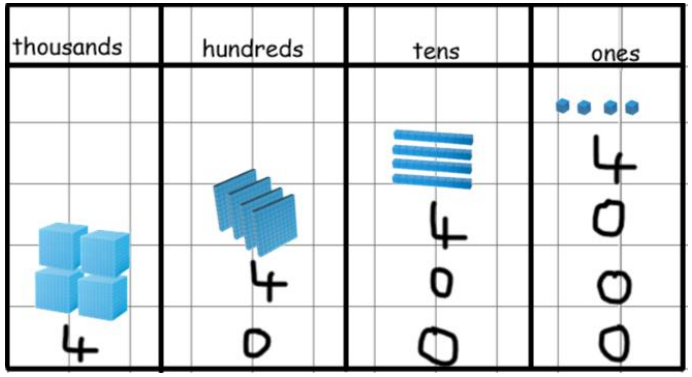
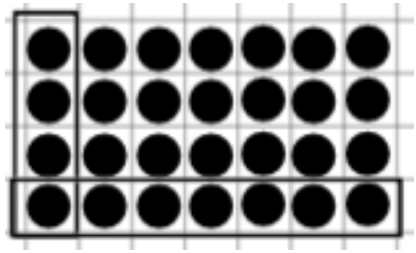
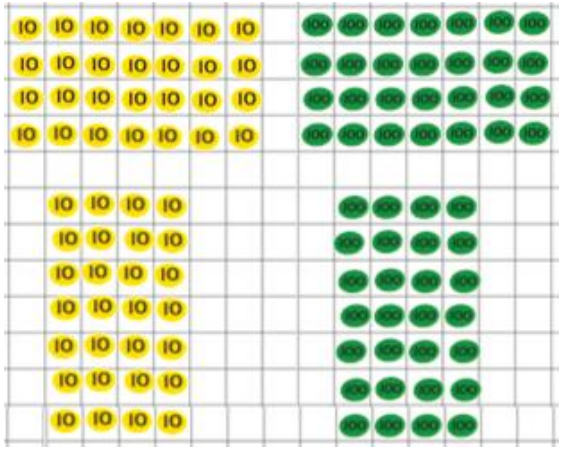
Year Group	Obj	Pictorial	Abstract
1	Skip counting in multiples of 2,5 and 10 from zero.		0,2, 4, 6, 8, 10… (2 x 3 = 12)
1	Making equal groups and counting the total.		. 2 groups of 4 . (2 x 4 = 8)
1	Solving multiplication using repeated addition		2 + 2 + 2 = 6
2	Skip counting in multiples of 2,3,4,5 and 10 from zero.		

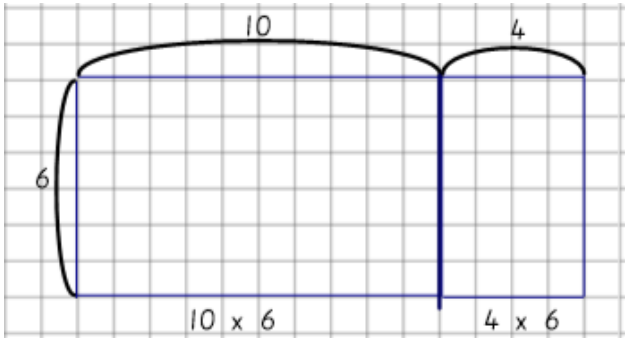
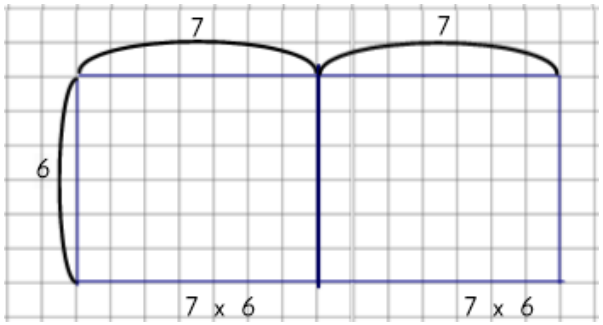
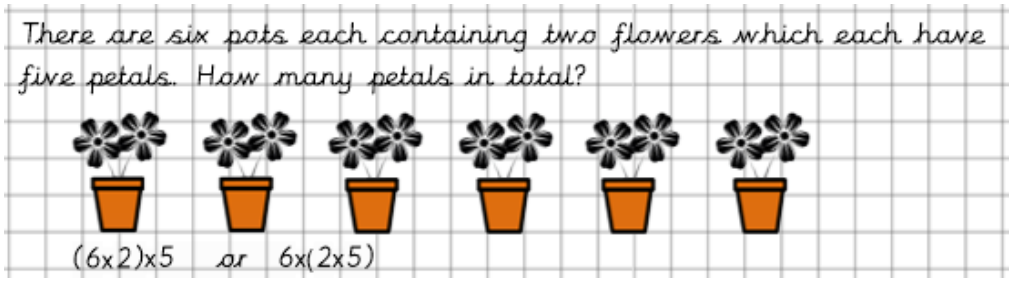
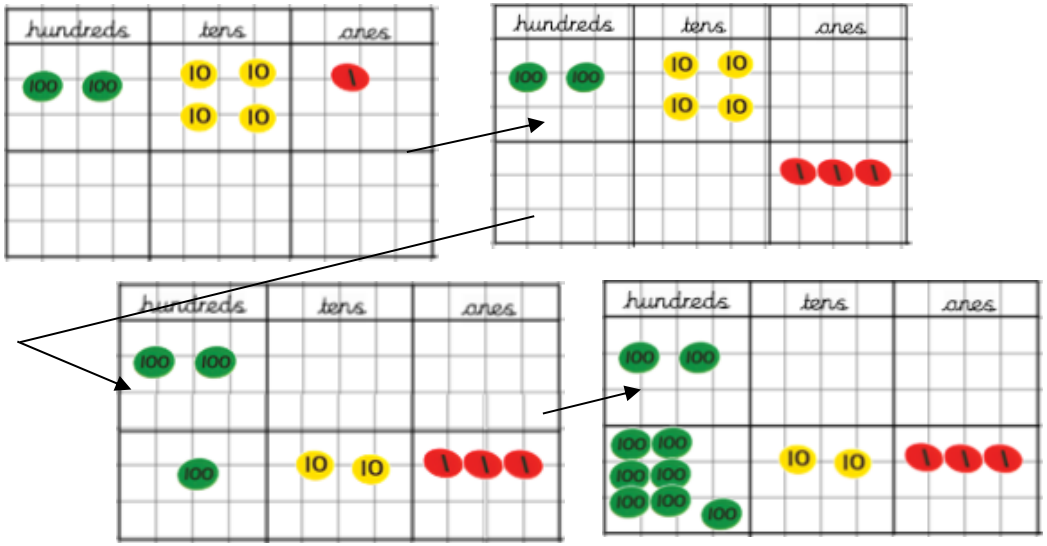
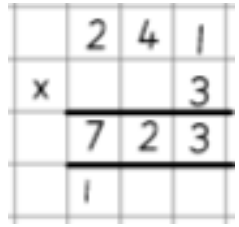
2	**Multiplication as repeated addition.**	 **4 + 4 + 4 + 4 + 4 = 5 x 4 = 20**  
2	**Arrays to represent multiplication equations.** Pupils begin to use the language 'rows' and 'columns' when creating arrays. Arrays are used to help children recognise the commutative nature of multiplication. Arrays can also be used to introduce the inverse relationship between multiplication and division.	   **4 x 5 = 20** **3 x 3 = 9** **3 x 4 = 12**
	Multiplication is commutative.	   **4 x 5 = 20** **5 x 4 = 20**

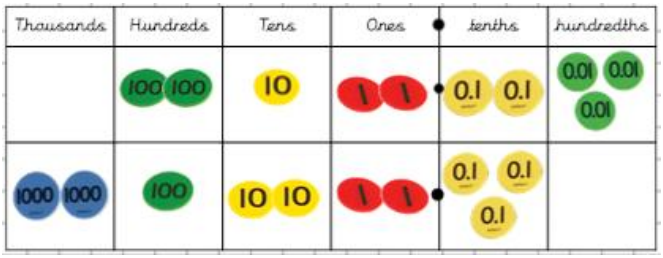
2	**Use of a P-W model to show the inverse relationship between multiplication and division.**	
3	**Doubling to derive new multiplication facts.**	
3	**Skip counting in multiples of 2,3,4,5,6,8 and 10.**	 **6, 12, 18 = 3 x 6 = 18**
3	**Use of P-W models alongside arrays and bar models to show commutativity and inverse relationship between multiplication and division.**	

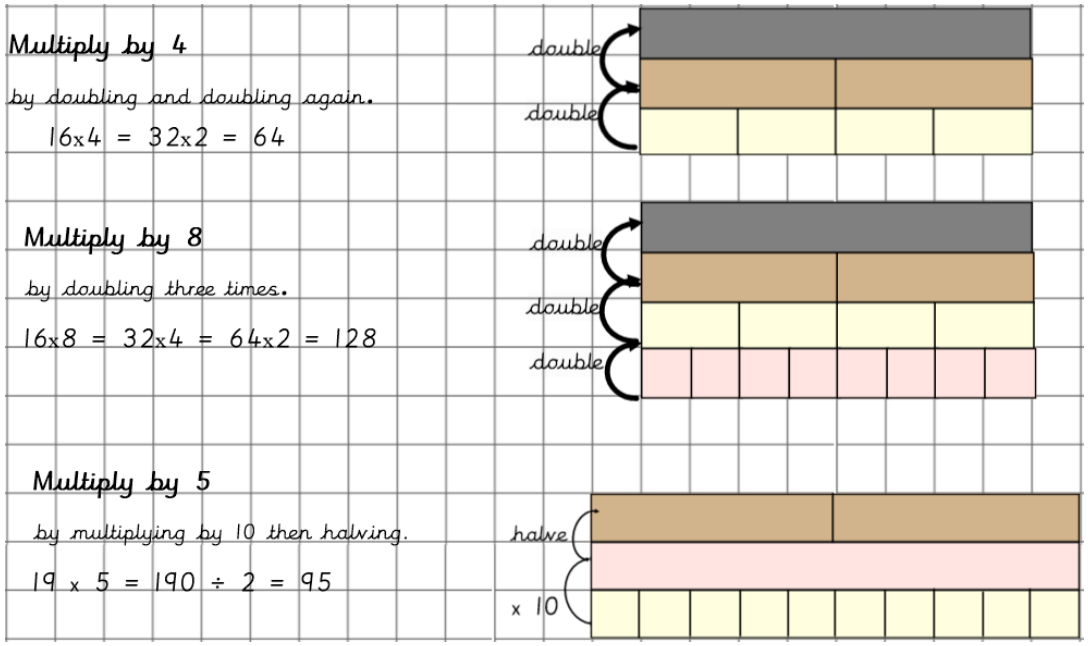
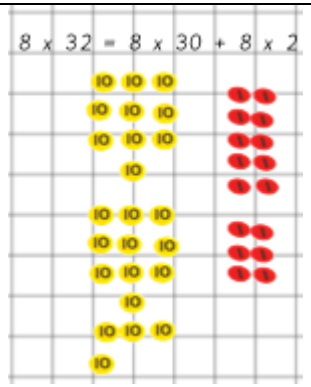
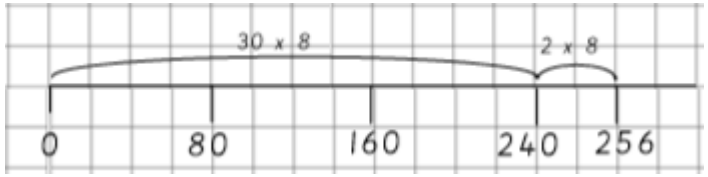
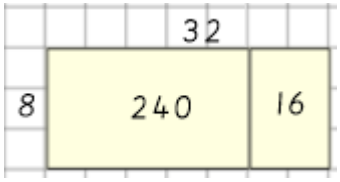
3	**Ten times greater.**	  **4 x 3 = 12** **4 x 30 = 120**
3	**Multiplying by 10 and 100.**	  **5 x 1 = 5** **5 x 10 = 50** **5 x 1 = 5** **5 x 100 = 500**
3	**Using known facts for multiplying by multiples of 10 and 100.**	 **If I know…** **3 x 2 = 6** **Then I also know...** **30 x 2 = 60** **300 x 2 = 600**

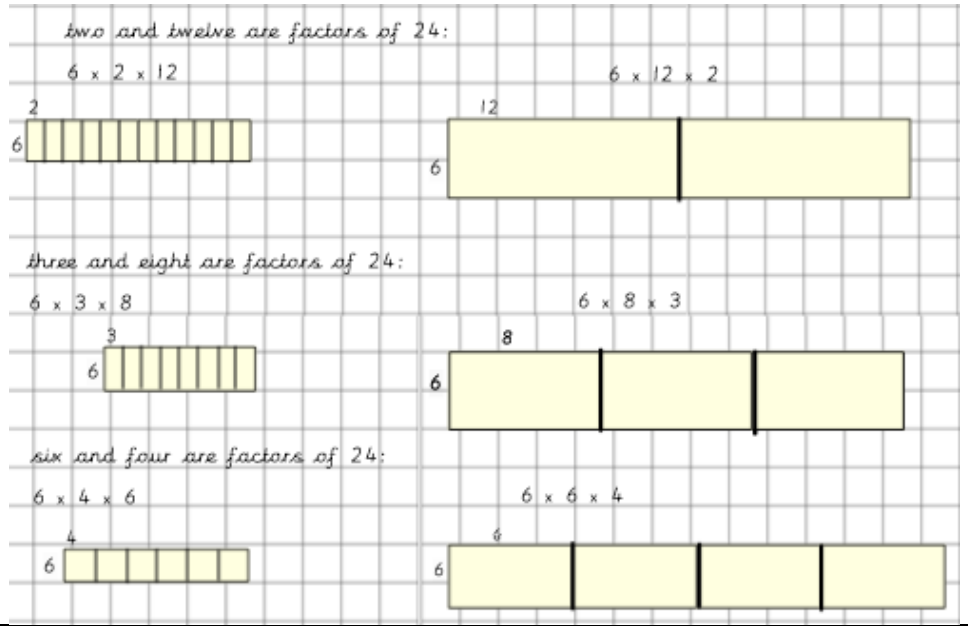
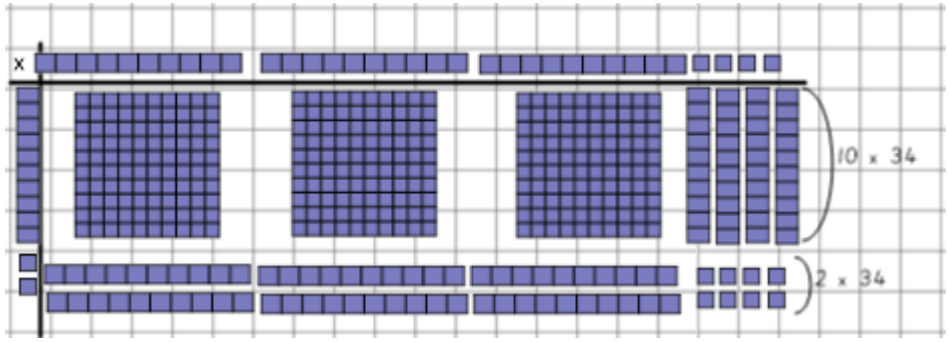
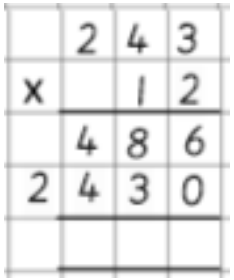
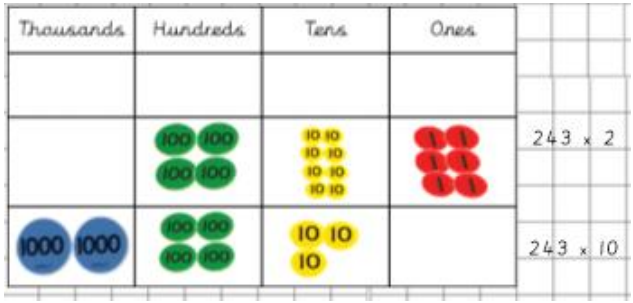
3	**Multiplication of 2-digit numbers with partitioning (no regrouping).**	   **12 x 3 = 36** **3 x 12 = 36**
3	**Multiplication of 2-digit numbers with partitioning**	  **15 x 3 = 45** **3 x 15 = 45**  **46 x 3 = 138** **3 x 46 = 138**

4	**Multiplying by 10 and 100**	
4	**Using known facts and place value for mental multiplication involving multiples of 10 and 100.**	 **Factor Factor Product** **4 x 7 = 28** **7 x 4 = 28**  **4 x 70 = 280** **4 x 700 = 2800** **7 x 40 = 280** **700 x 4 = 28000**

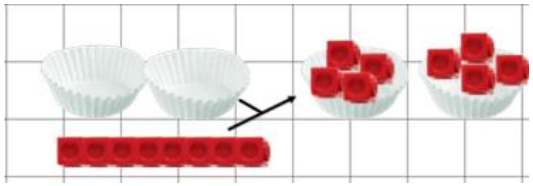
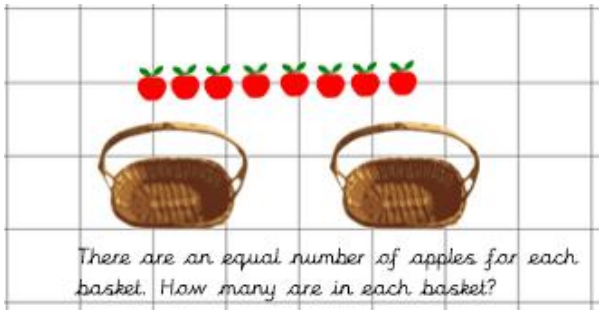
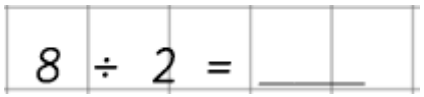
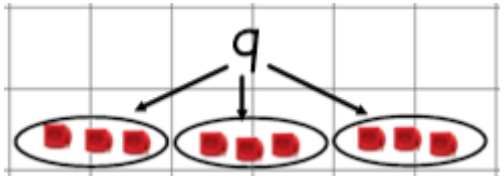
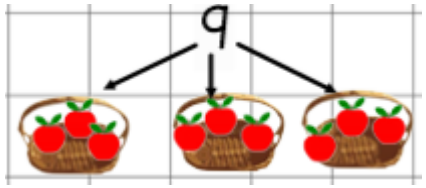
4	**Multiplying by partitioning one number and multiplying each part.** ***Distributive Law:*** ***a x (b+c) = a x b + a x c***	  **14 x 6 = 84**
4	**Mental multiplication of three 1-digit numbers, using the associative law.** *Pupils will be able to understand that multiplication can be completed in any order. They should be able to use this to choose the most efficient order to complete the calculation.*	
4	**Short multiplication of 3-digit number by 1-digit number.** To start with, pupils complete calculations with no regrouping or only regrouping from the ones to the tens. Conceptual understanding is supported by the use of PV counters.	 

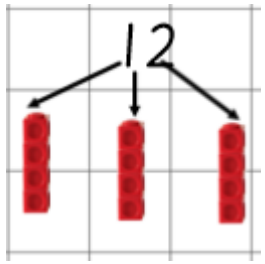
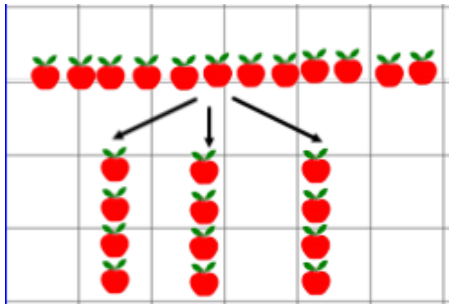
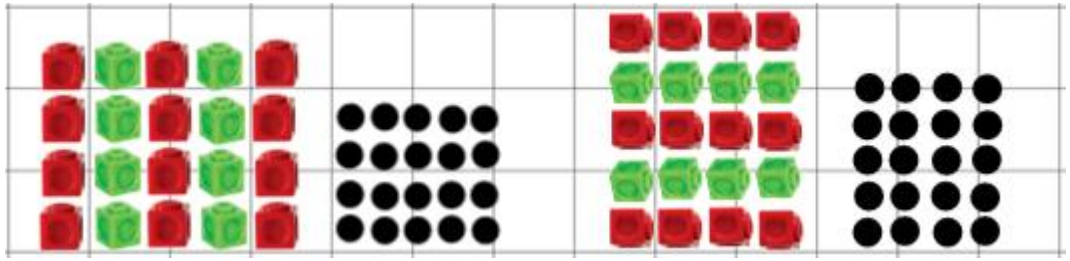
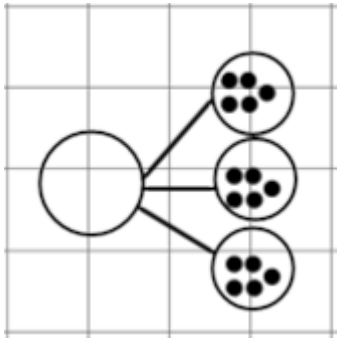
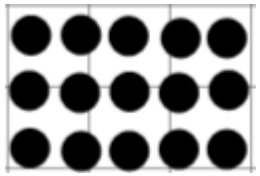
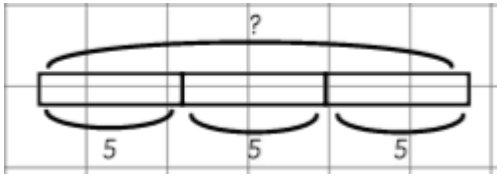
5/6	**Multiply (and divide) whole numbers and those involving decimals by 10,100 and 1000.** *Avoid saying 'add a zero' when multiplying by ten. Instead, use the language of place holder.*	 **212.23 x 10 = 2122.3**
5/6	**Using known facts and place value to derive multiplication facts.** ***(An extension on strategies previously modelled in this document).***	**Pupils should be able to derive the following multiplication facts from a known fact.** **6 x 4 = 24:** 2,400,000 | 600,000x4 | 60,000x40 | 6000x400 | 600x4000 | 60x40,000 | 6x400,000 240,000 | 60,000x4 | 6000x40 | 600x400 | 60x4000 | 6x40,000 24,000 | 6000x4 | 600x40 | 60x400 | 6x4000 2,400 | 600x4 | 60x40 | 6x400 240 | 60x4 | 6x40 **24 = 6x4** 2.4 | 0.6x4 | 6x0.4 0.24 | 0.06x4 | 0.6x0.4 | 6x0.04 0.024 | 0.006x4 | 0.06x0.4 | 0.6x0.04 | 6x0.004

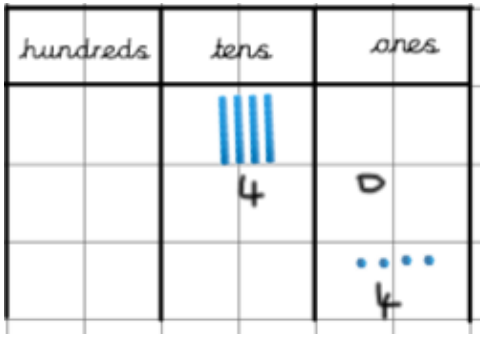
5/6	**Doubling strategies.**	
5/6	**Multiply by partitioning one number and multiplying each part.** *Distributive law:* *a x (b+c) = a x b + a x c*	   **8 x 32 = 256** **32 x 8 = 256**

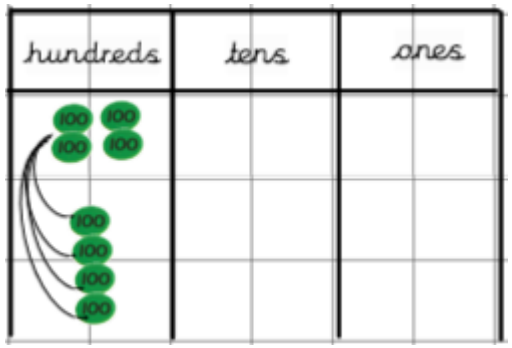
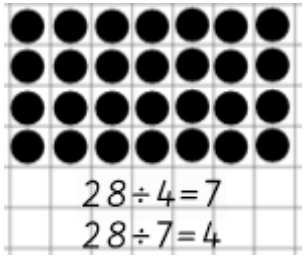
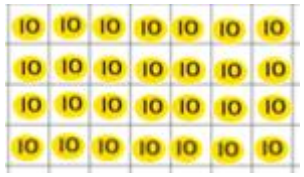
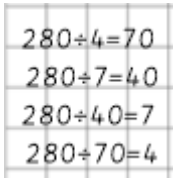
5/6	**Using knowledge of factors.** *Commutative law:* *a x b = b x a* *Associative law:* *A x b x c = (a x b) x c = a x (b x c)*	
5/6	**Multiplying by a 2-digit number – Formal written method of long multiplication**	  

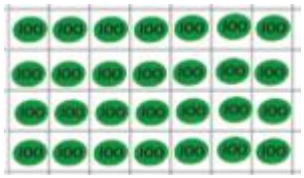
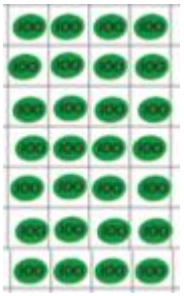
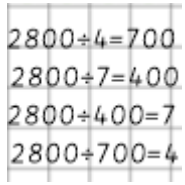
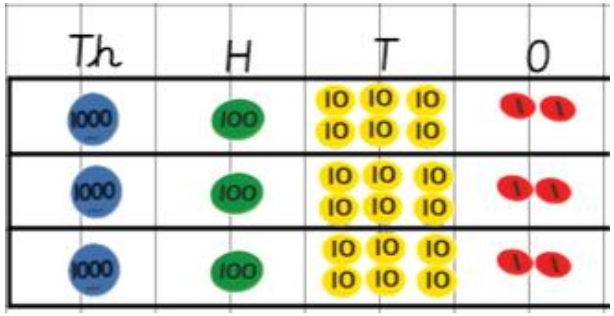
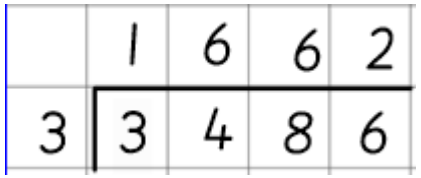
Division

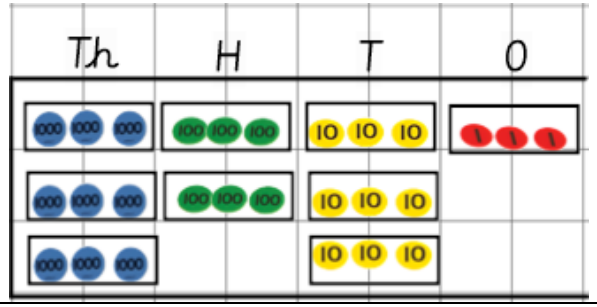
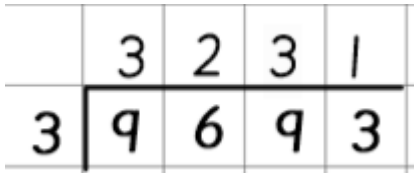
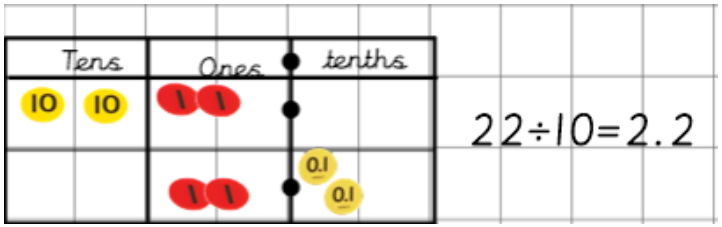
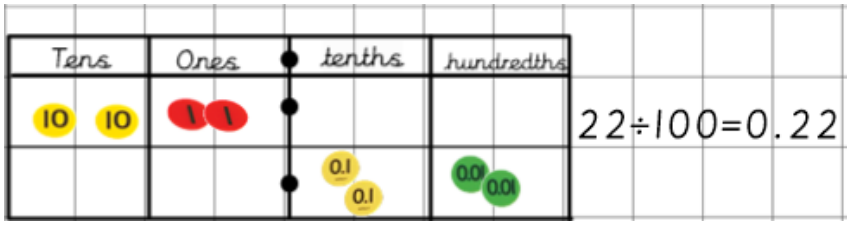
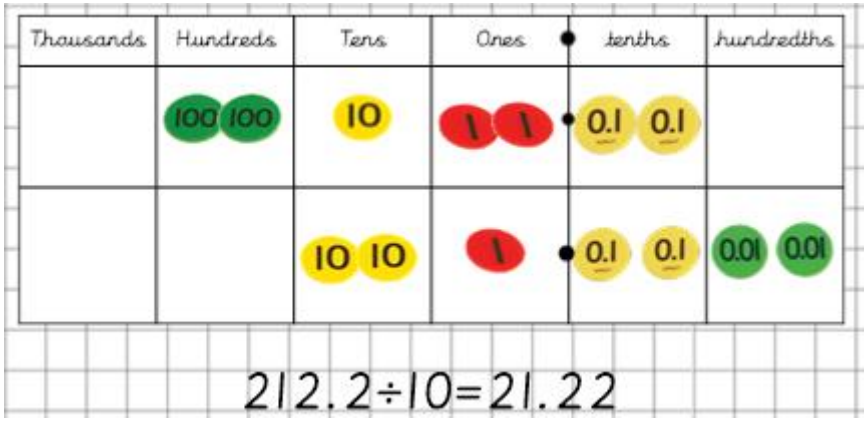
Year	Objective/ Strategy	Concrete	Pictorial	Abstract
1	**Sharing objects into groups.**			
2	**Division as sharing.** *This is used when the number of parts is known but the value of each part is unknown.*	 		**9÷3=__**

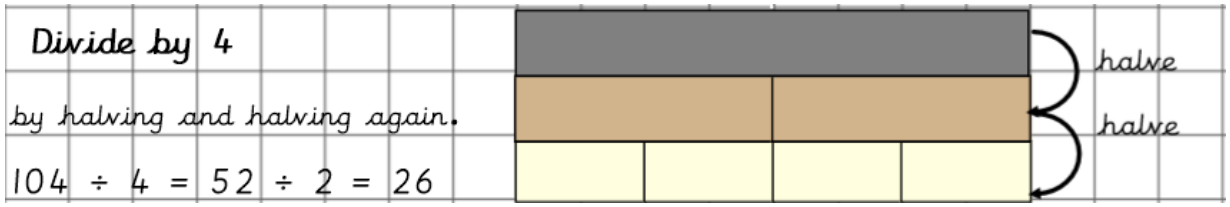
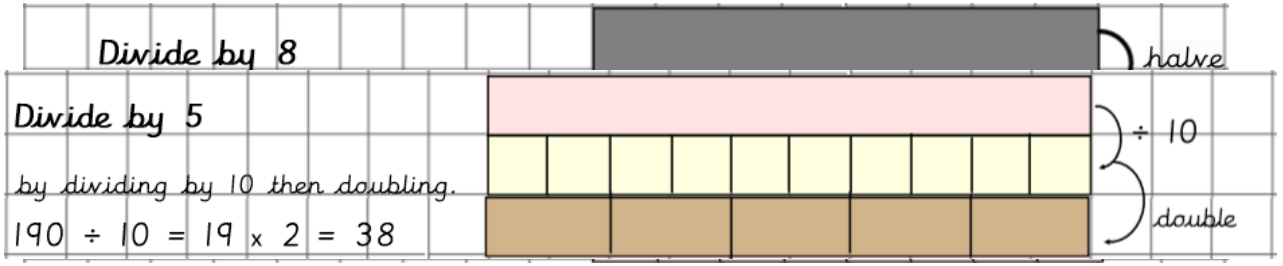
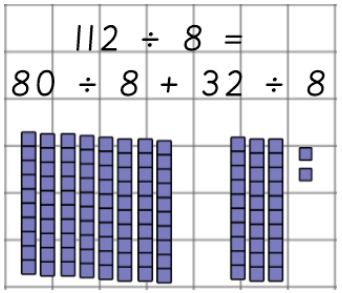
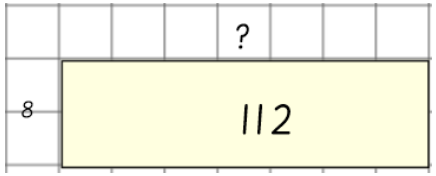
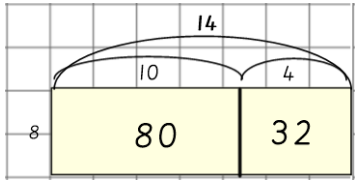
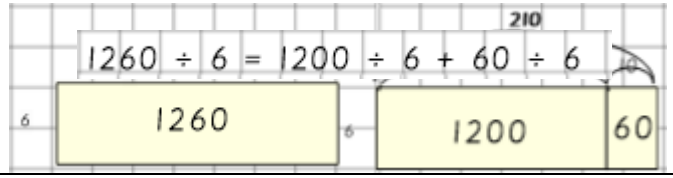
2	**Division as sharing.** *This is used when the value of each part is known but not the number of parts.*	  **12÷___=4**
2	**Use arrays to emphasis the relationship between multiplicatio n and division.**	 **20 ÷ 4 = 5** **20 ÷ 5 = 4**
2	**Use of part-whole model with arrays and bar models to further establish commutativi ty and inverse relation between**	  **15** **15 ÷ 5 = 3**  **15 ÷ 3 = 5** **3 x 5 = 15** **5 x 3 =**

	multiplication and division.	
3/4	**Dividing multiples of 10,100 and 1000 by 10, 100 and 1000 using scaling down.** *Pupils create the numbers with concrete manipulatives and then make this value 10x smaller.*	 **40 ÷ 10 = 4**

3/4	**Dividing multiples of 10,100 and 1000 by 10,100 and 1000 using grouping.** *Pupils divide by 10, 100 and 1000 by making groups of the divisor.*	 **400 ÷ 100 = 4**
4	**Derived facts.**	   

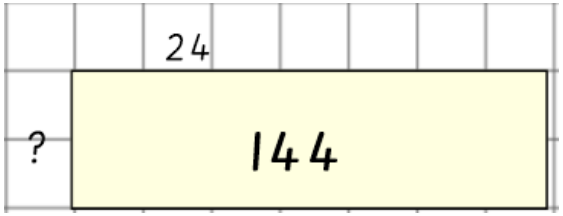
		  
4	**Short division of 4-digit numbers by 1-digit numbers.**	**Division as sharing**   **Division as grouping**

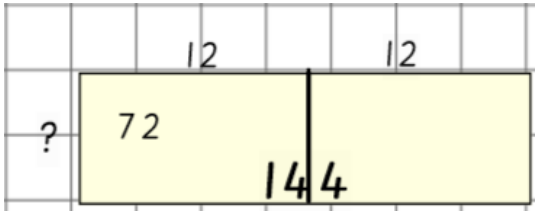
		 
4	**Division of a 1- or 2-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.**	 
4 - 6	**Divide whole numbers and those involving decimals by 10, 100 and 1000.**	

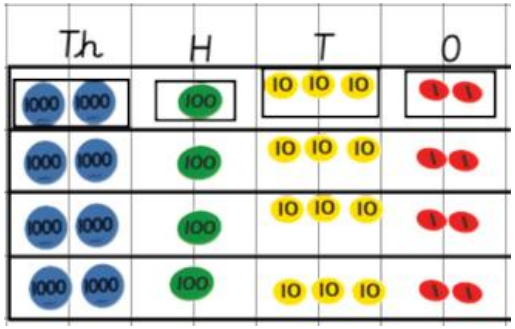
5/6	**Halving strategies for division.**	 
5/6	**Using knowledge of multiples to divide.** *Make use of an area model to partition the whole into multiples of the divisor.*	   

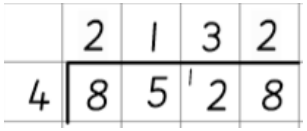
<table>
<tr>
<td>5/
6</td>
<td>Using knowledge of factors to divide.

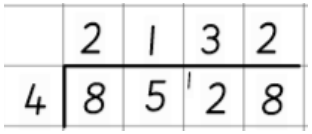
Pupils to explore this strategy when using repeated halving.

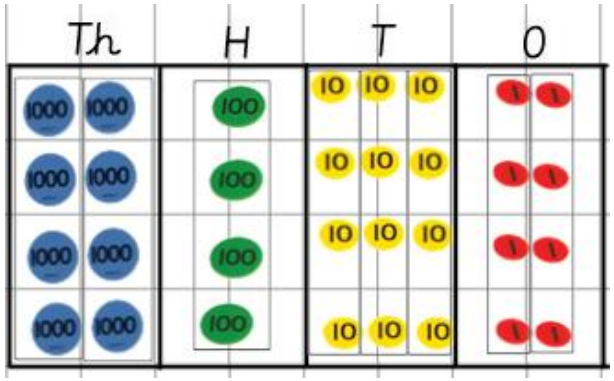
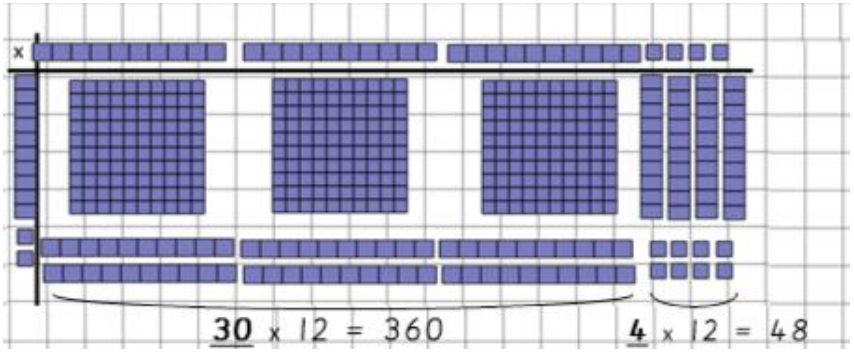
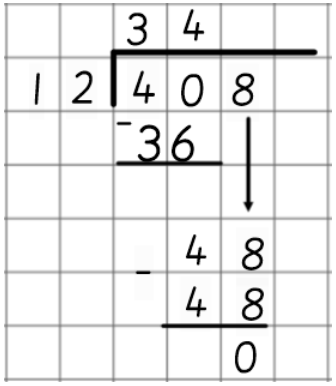
2 x 2 = 4 so if you divide by 4 the same result can be achieved by dividing by two and then two again.</td>
<td>2 and 12 are a factor pair of 24 so I can divide by two and then by 12.
 

144 ÷ 24 =? so 

144 ÷ 2 ÷ 12 =?</td>
</tr>
<tr>
<td>5/
6</td>
<td>Short division of 4-digit numbers by 1-digit numbers.</td>
<td>Division as sharing
 



8 thousands shared into 4 equal groups
5 hundreds shared into 4 equal groups
(regroup 1 hundred for 10 tens)
12 tens shared into 4 equal groups
8 ones shared into 4 equal groups.</td>
</tr>
<tr>
<td>5/
6</td>
<td>Short division of 4-digit numbers by 1-digit numbers.</td>
<td>Division as grouping
 
</td>
</tr>
</table>

		 How many groups of 4 thousands in 8 thousands? How many groups of 4 in 5 hundreds? (regroup 1 hundred for 10 tens). How many groups of 4 tens in 12 tens? How many groups of 4 ones in 8 ones?
5/6	**Long division. Dividing a 4-digit number by a 2-digit number.**	  **408 ÷ 12 = 34**