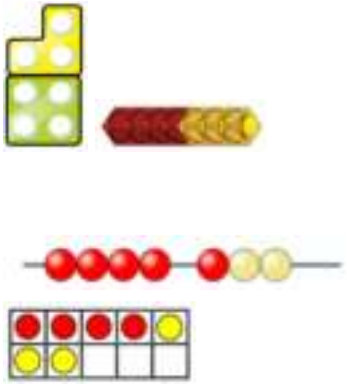
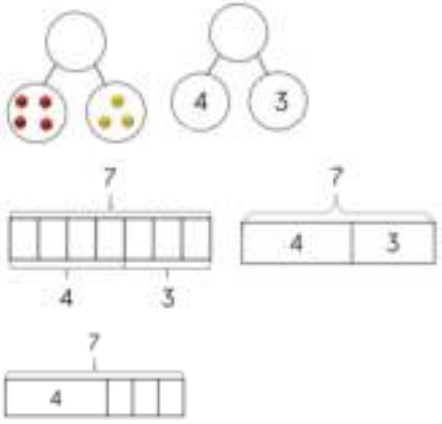
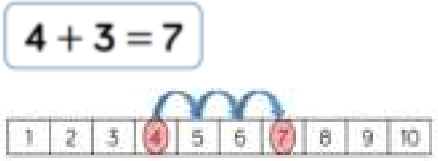
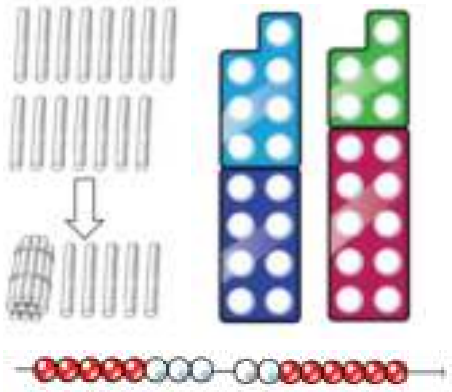
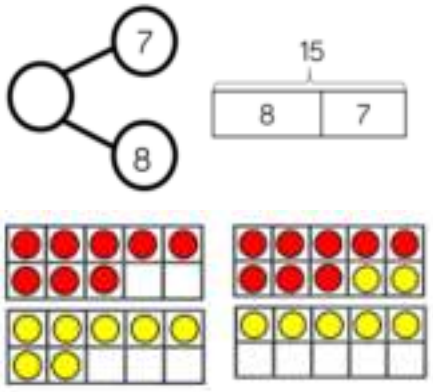
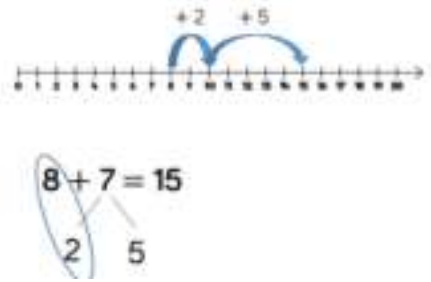
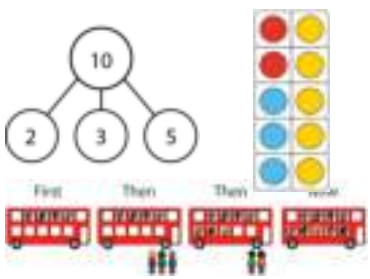
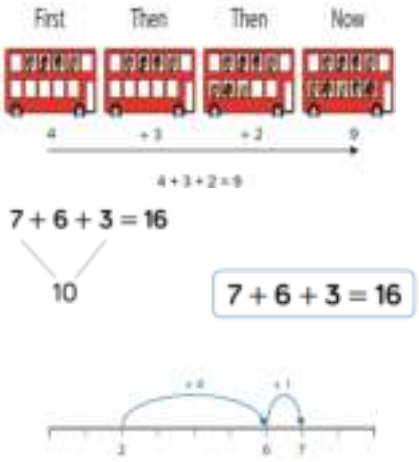
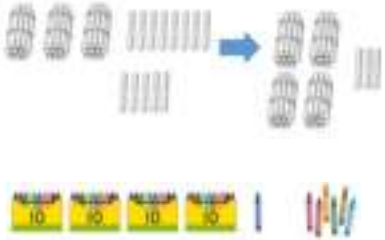
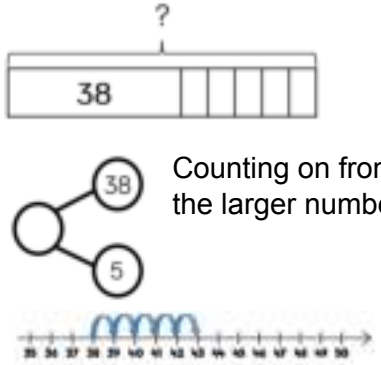
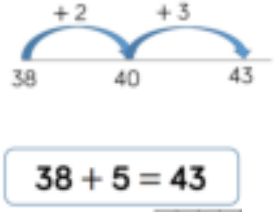
Addition

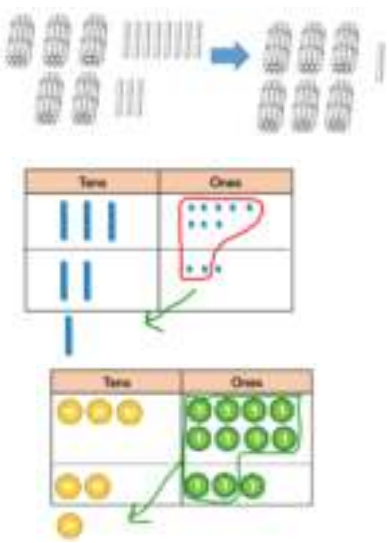
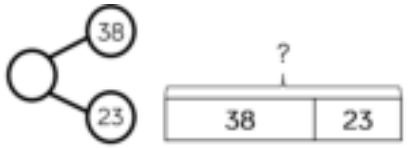
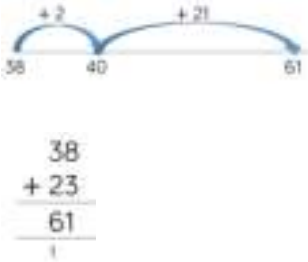
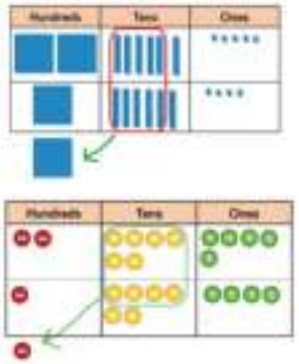
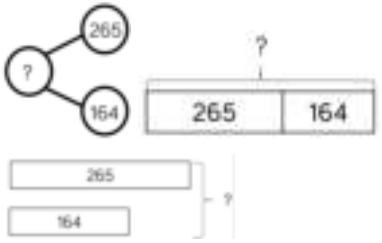
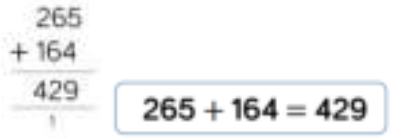
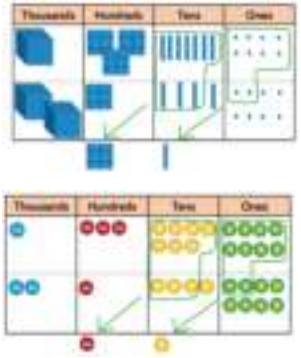
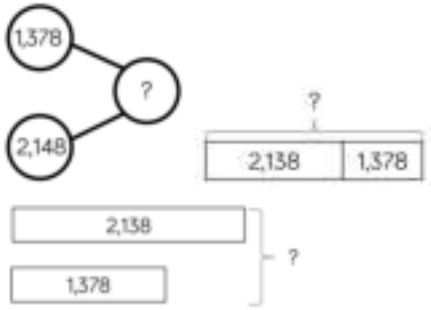
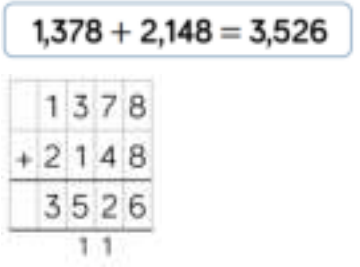
ST. MARK'S PRIMARY SCHOOL
COMMUNITY, ACHIEVEMENT, RESPECT, ENJOYMENT

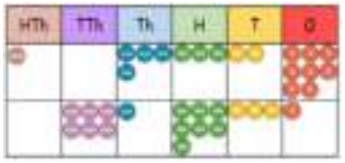
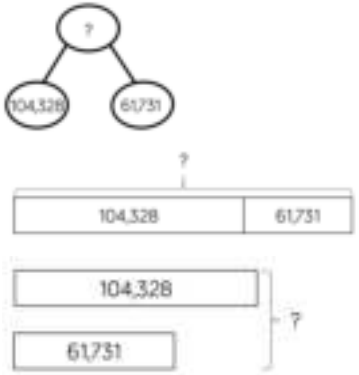
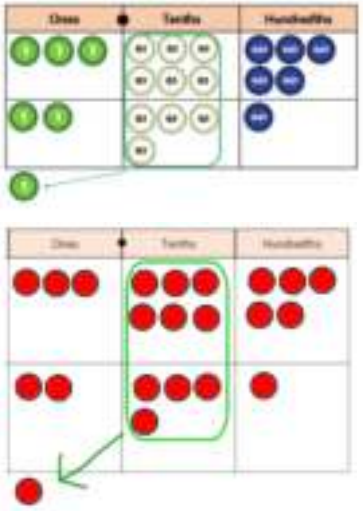
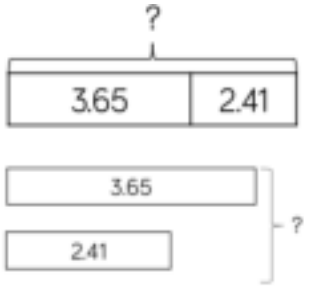
Key Vocabulary: (The children need to be able to use this language in their learning)

Add	**Increase**	**Total**
Sum	**And**	
Addition	**More**	
Altogether	**Count on**	
Plus	**Count all**	

Year Group	Skill	Representations and Models	Concrete The 'doing' stage	Pictorial The 'seeing' stage	Abstract The 'symbolic' stage
1	Add two 1-digit numbers to 10 (aggregation & augmentation)	Part- whole model Bar model Number shapes	 **(support augmentation)**		

1	Add 1 and 2-digit numbers to 20	Part- whole model Bar model Number shapes Ten frames (within 20)			
2	Add three 1-digit numbers (addends)	Part- whole model B ar model			
2	Add 1 and 2-digit numbers to 100	Part- whole model Bar model Number lines (labelled) Straws			

2	Add two 2-digit numbers	Part- whole model Bar model Number lines (blank) Straws			
3	Add with up to 3-digits	Part- whole model Bar model			
4	Add with up to 4-digits	Part- whole model Bar model			

5	Add with more than 4 digits	Part- whole model Bar model			104,328 + 61,731 = 166,059 1 0 4 3 2 8 + 6 1 7 3 1 1 6 6 0 5 9 1
5	Add with up to 3 decimal places	Part- whole model Bar model			3.65 + 2.41 = 6.06 3.65 + 2.41 6.06 1

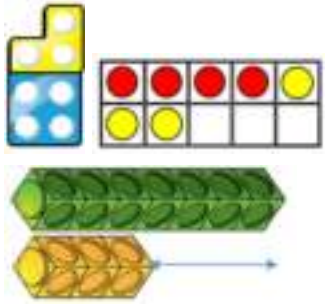
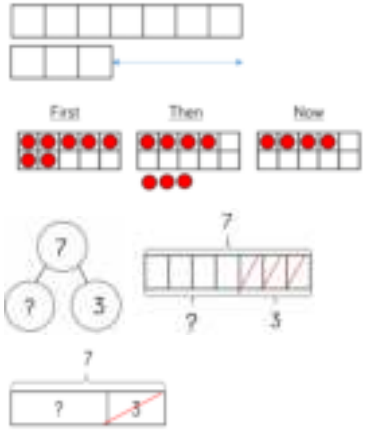
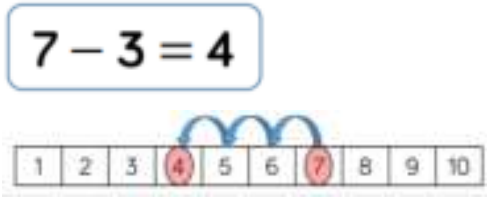
Subtraction

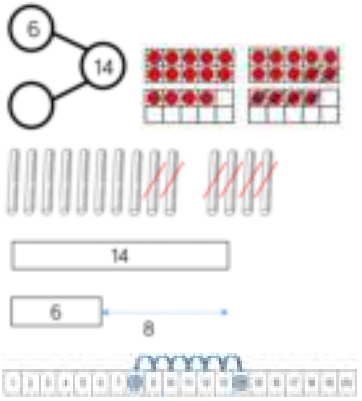
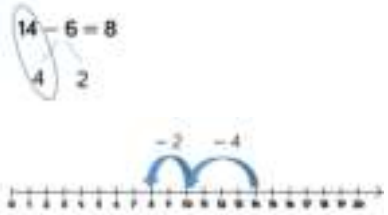
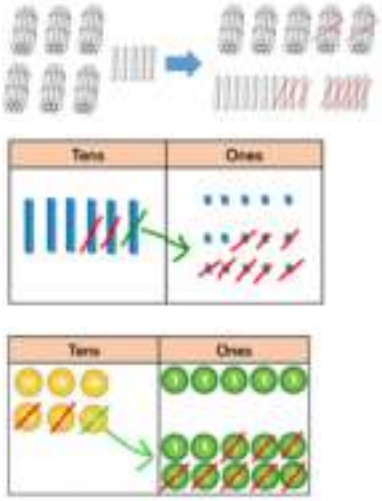
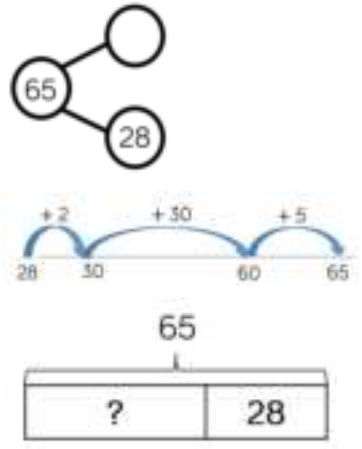
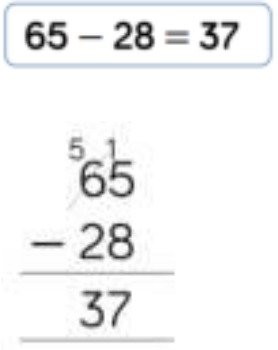
Key Vocabulary: (The children need to be able to use this language in their learning)

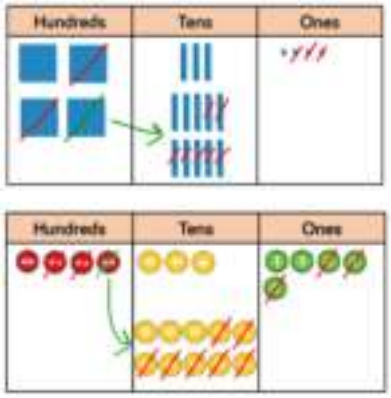
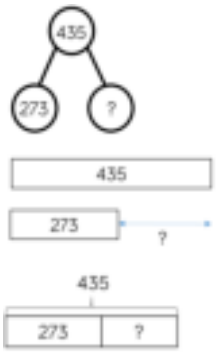
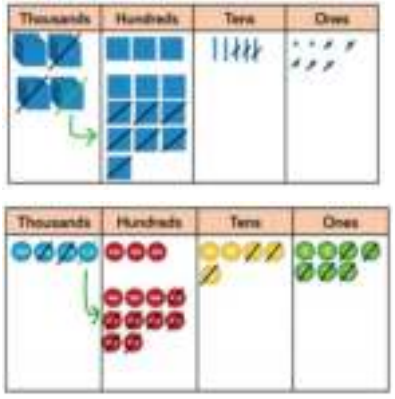
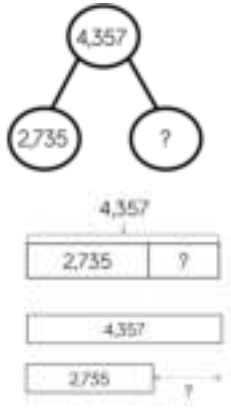
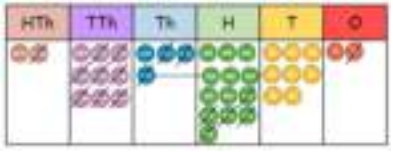
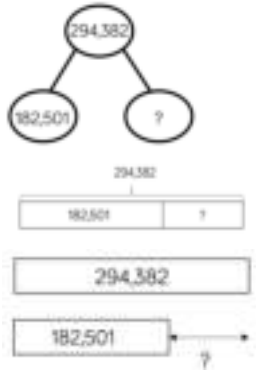
Subtract	**Decrease by**	**Reduce**	**Exchange**
Less than	**Distance between**	**Count back/on**	**Take from**
Take away	**Deduct**	**Minus**	
Fewer than	**Difference**	**Inverse**	

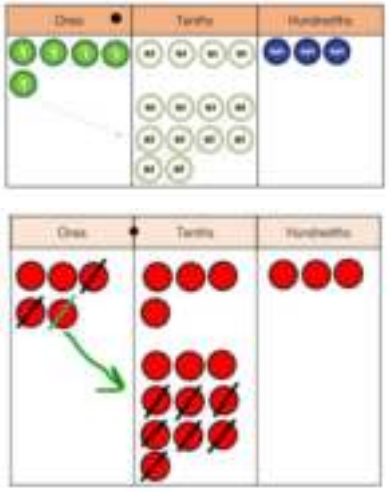
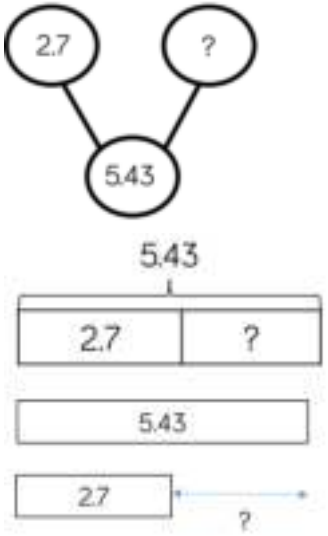
Children need to understand that subtraction is not commutative or associative.

Partitioning: Splitting a number into its component parts
Difference: The numerical difference between two numbers is found by comparing the quantity in each group
Reduction: Subtraction as takeaway

Year Group	Skill	Representations and Models	Concrete	Pictorial	Abstract
1	Subtract two 1-digit numbers to 10	Part-whole model Bar model Number shapes Ten frames (within 10) Bead string (10) Number tracks			

1	Subtract 1 and 2-digit numbers to 20	Part-whole model Bar model Number shapes Ten frames (within 20) Bead string (20) Number tracks Number lines (labelled) Straws			
2	Subtract 1 and 2-digit numbers to 100	Part-whole model Bar model Number lines (labelled & blank) Straws Hundred square			
2	Subtract two 2-digit numbers	Part-whole model Bar model Number lines (blank) Straws Base 10 Place value counters Column addition			

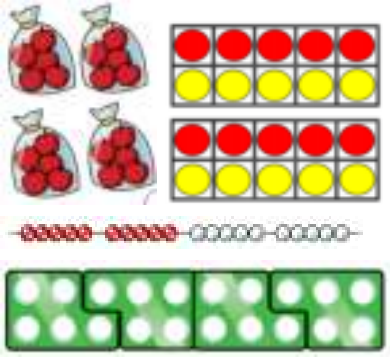
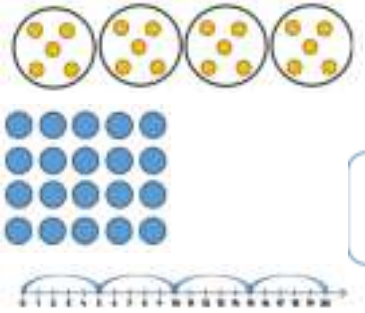
3	Subtract with up to 3-digits	Part-whole model Bar model Base 10 Place value counters Column addition			**435 − 273 = 262** $\begin{array}{r} {}^{3}\not{4}{}^{1}\not{3}5 \\ -\ 273 \\ \hline 262 \end{array}$ Ensure that the children write out their calculation alongside any concrete resources so they can see the links to the written column method.
4	Subtract with up to 4-digits	Part-whole model Bar model Base 10 Place value counters Column addition			**4,357 − 2,735 = 1,622** $\begin{array}{r} {}^{3}\not{4}{}^{1}357 \\ -\ 2735 \\ \hline 1622 \end{array}$ Ensure that the children write out their calculation alongside any concrete resources so they can see the links to the written column method.
5	Subtract with more than 4-digits	Part-whole model Bar model Base 10 Place value counters Column addition			**294,382 − 182,501 = 111,881**  Ensure that the children write out their calculation alongside any concrete resources so they can see the links to the written column method.

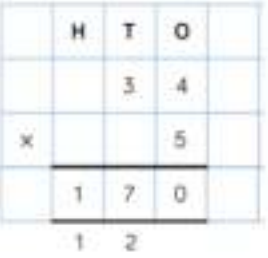
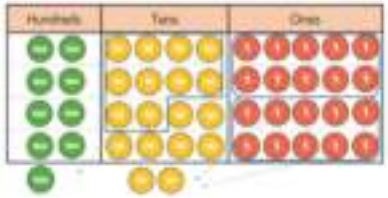
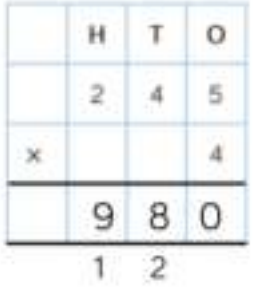
5	Subtract with up to 3 decimal places	Part-whole model Bar model Base 10 Place value counters Column addition			$5.43 - 2.7 = 2.73$ $\begin{array}{r} {}^{4}\not{5}.{}^{1}43 \\ -\ 2.7 \\ \hline 2.73 \end{array}$ Ensure that the children write out their calculation alongside any concrete resources so they can see the links to the written column method.

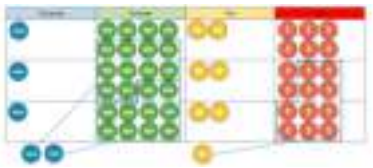
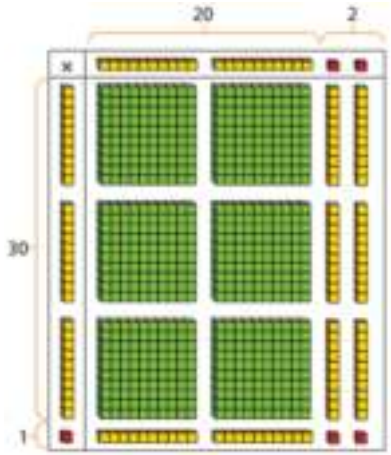
Multiplication

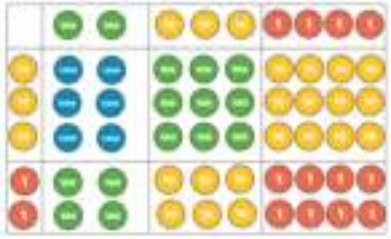
Key Vocabulary: (The children need to be able to use this language in their learning)

Multiply	**Product**	**Distributive**
Multiplication	**Multiple**	**Associative**
Times	**Double**	
Lots of	**Factors**	
Groups of	**Repeated addition**	
Sets of	**Commutative**	

Year Group	Skill	Representations and Models	Concrete	Pictorial	Abstract
1/2	Solve 1-step problems using multiplication	Bar model Number shapes Counters Ten frames Bead strings Number lines Children represent multiplication as repeated addition in many different ways.			$5 + 5 + 5 + 5 = 20$ $4 \times 5 = 20$ $5 \times 4 = 20$ One bag holds 5 apples. How many apples do 4 bags hold?
3/4	Multiply 2-digit by 1-digit numbers	Place value counters Base 10 Short written method Expanded written method			$34 \times 5 = 170$ Expanded column method

			 Place value counters should be used to support understanding of the method rather than supporting the multiplication, as children should use times table knowledge.		 Short multiplication method 
4	Multiply 3-digit by 1-digit numbers	Place value counters Base 10 Short written method	 		$245 \times 4 = 980$  Short formal written method

5	Multiply 4-digit by 1-digit numbers	Place value counters Short written method			1,826 × 3 = 5,478 
5	Multiply 2-digit by 2-digit numbers	Place value counters Base 10 Short written method Grid method	 Use the area model to help children understand the size of the numbers they are using. This links to finding the area of a rectangle by finding the space covered by the base 10.		22 × 31 = 682 × 20 2 30 600 60 1 20 2 H T O 2 2 × 3 1 2 2 6 6 0 6 8 2

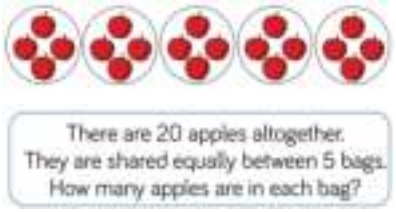
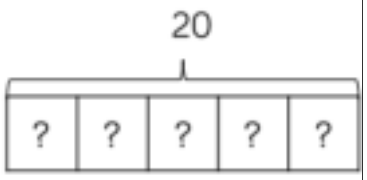
					
5	Multiply 2-digit by 3-digit numbers	Place value counters Short written method Grid method	 Children can continue to use the area model when multiplying 3-digits by 2-digits. Place value counters become more efficient to use but Base 10 can be used to highlight the size of the numbers.		$234 \times 32 = 7{,}488$ × 200 30 4 30 6,000 900 120 2 400 60 8 Th H T O 2 3 4 × 3 2 4 6 8 1 7 1 0 2 0 7 4 8 8
5/6	Multiply 4-digit by 2-digit numbers	Formal written method			TTh Th H T O 2 7 3 9 × 2 8 2 1 9 1 2 2 5 3 7 1 5 4 7 8 0 1 7 6 6 9 2

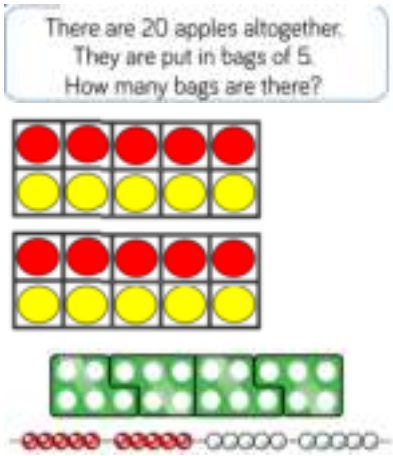
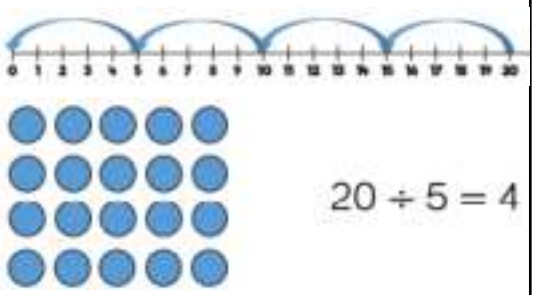
					$2{,}739 \times 28 = 76{,}692$ Children should now be confident in the written method. Consider where exchanged digits are placed and make sure this is consistent.

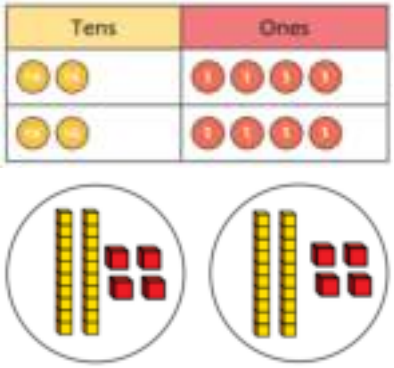
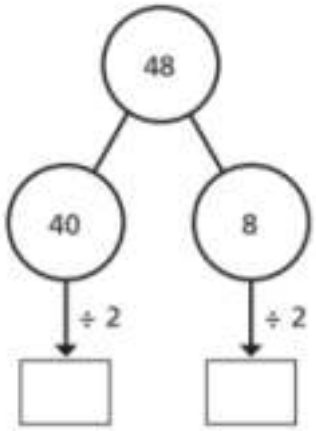
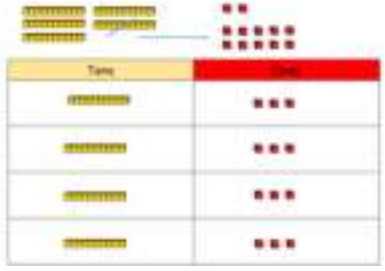
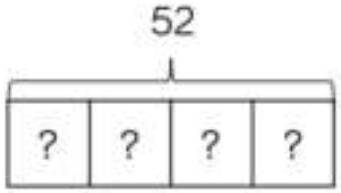
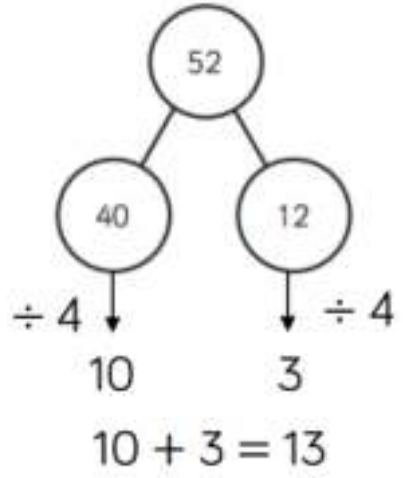
Division

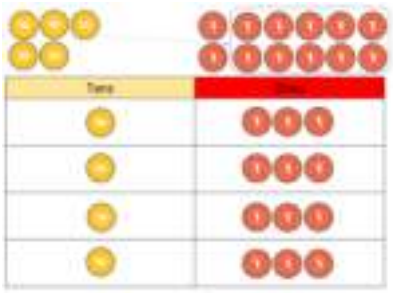
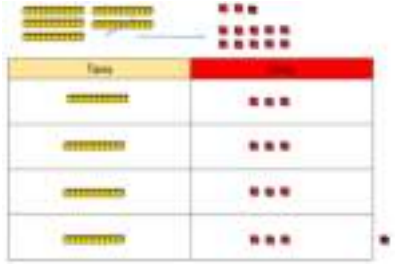
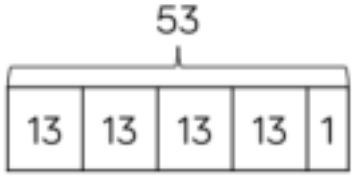
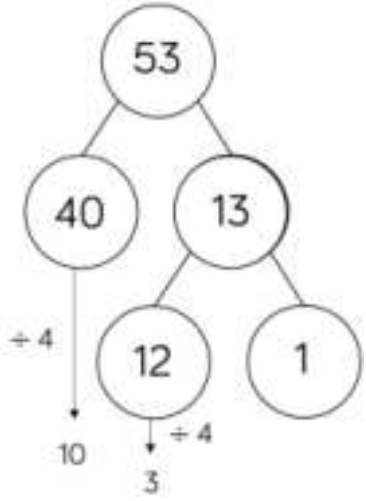
Key Vocabulary: (The children need to be able to use this language in their learning)

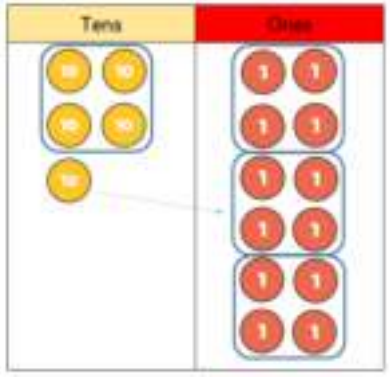
Groups	**Share**	**Remainders**
Grouping	**Sharing**	**Divisor**
Repeated subtraction	**Exchange**	**Array**
Quotient	**Multiples**	

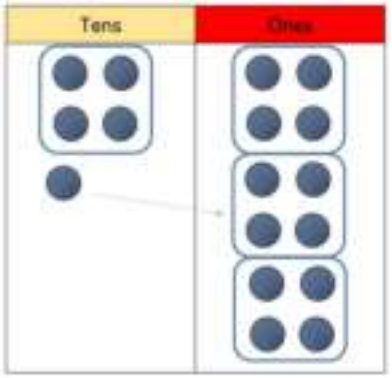
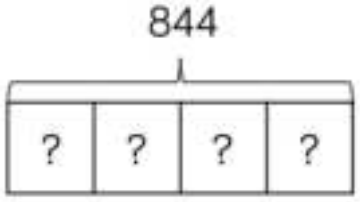
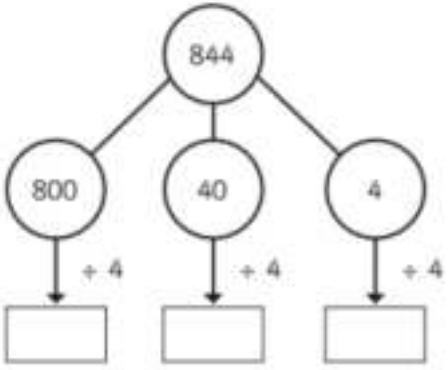
Year Group	Skill	Representations and Models	Concrete	Pictorial	Abstract
1/2	Solve one-step problems with division (sharing)	Bar model Real life objects Arrays Counters	 Children solve problems by sharing amounts into equal groups		In Year 1, children are not expected to record division formally. In Year 2, children are introduced to the division symbol. 

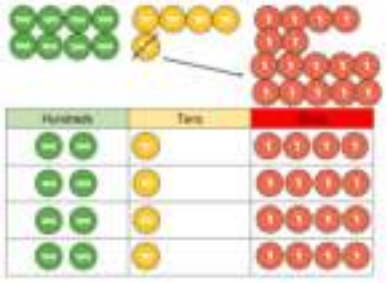
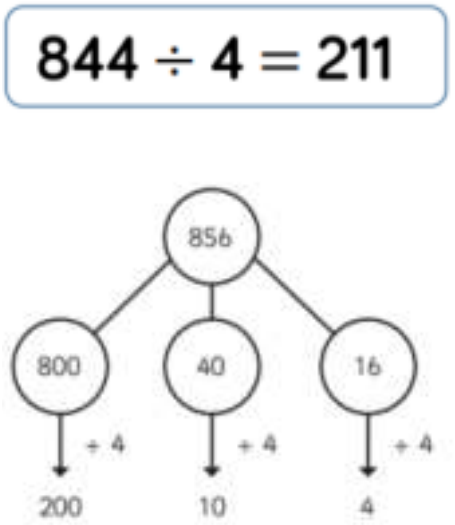
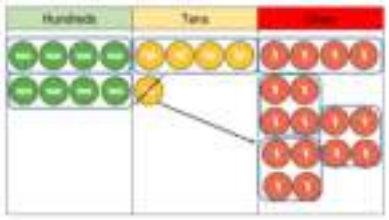
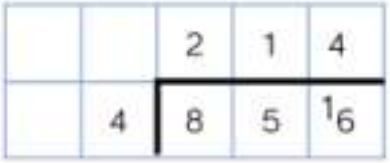
1/2	Solve one-step problems with division (grouping)	Real life objects Number shapes Bead strings Ten frames Number lines Arrays Counters	 Children solve problems by grouping and counting the number of groups. They can use concrete representations in fixed groups such as number shapes which helps to show the link between multiplication and division.		 Grouping encourages children to count in multiples and links to repeated subtraction on a number line.

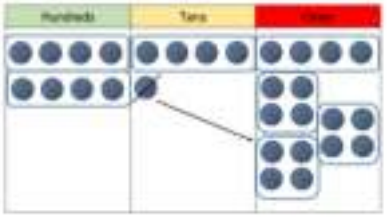
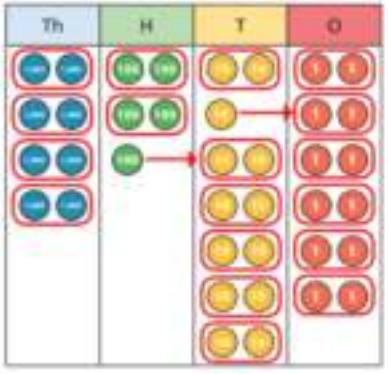
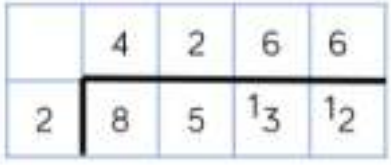
3	Divide 2-digits by 1-digit (no exchange sharing)	Base 10 Bar model Place value counters Part-whole model	 When dividing larger numbers, children can use manipulatives that allow them to partition into tens and ones.		 Part-whole models can provide children with a clear written method that matches the concrete representation. $48 \div 2 = 24$
3	Divide 2-digits by 1-digit (sharing with exchange)	Straws Base 10 Bar model Place value counters Part-whole model			

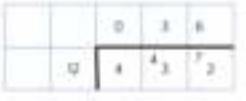
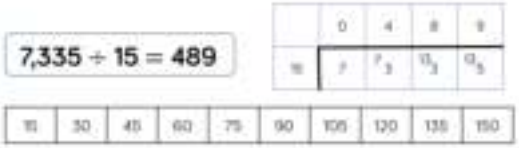
			 When dividing numbers involving an exchange, children can use Base 10 and place value counters to exchange on ten for ten ones. Children should start with the equipment outside the place value grid before sharing the tens and ones equally between the rows.		$52 \div 4 = 13$ Flexible partitioning in a part-whole method supports this method.
3/4	Divide 2-digits by 1-digit (sharing with remainders)	Straws Base 10 Bar model Place value counters Part-whole model			

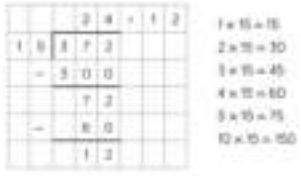
			 When dividing numbers with remainders, children should use Base 10 and place value counters to exchange one ten for ten ones. Starting with the equipment outside the place value grid will highlight remainders, as they will be left outside the grid once the equal groups have been made.		$53 \div 4 = 13\ r1$ Flexible partitioning in a part-whole method supports this method
4/5	Divide 2-digits by 1-digit (grouping)	Base 10 Bar model Place value counters Part-whole model	 		$52 \div 4 = 13$  When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor.

			 Language is important here. 'How many groups of 4 tens can we make?' 'How many groups of 4 ones can we make?' Remainders can also be seen as they are left ungrouped.		
4	Divide 3-digits by 1-digit (sharing with exchange)	Base 10 Bar model Place value counters Part-whole model			
4/5	Divide 3-digits by 1-digit (grouping)	Place value counters Counters Place value grid Written short division			

			 Children can continue to use place value counters to share 3-digit numbers into equal groups. Children should start with the equipment outside the place value grid before sharing the hundreds, tens and ones equally between the rows. This method can also help to highlight remainders.		 Flexible partitioning in a part-whole method supports this method
5	Divide 3-digits by 1-digit (grouping)	Place value counters Counters Place value grid Written short division		Children can also draw their own counters and group them through a more pictorial method.	

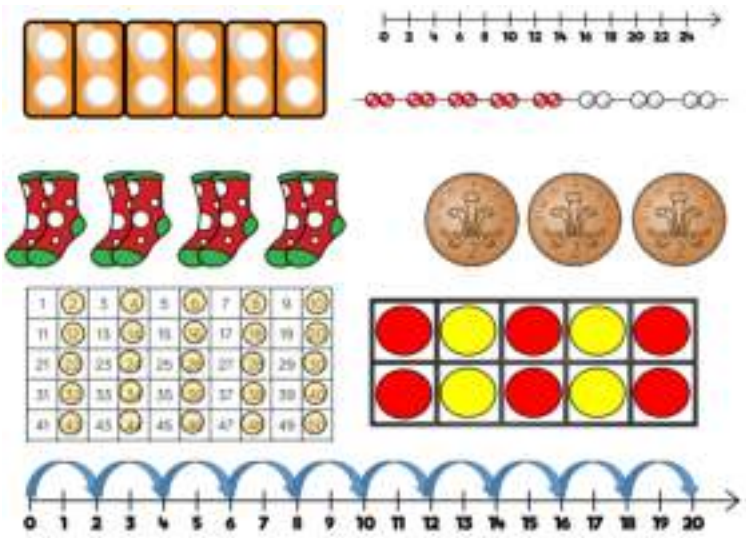
			 Children can continue to use grouping to support their understanding of short division when dividing a 3-digit number by a 1-digit number. Place value counters or plain counters can be used on a place value grid to support their understanding.		$856 \div 4 = 214$
5	Divide 4-digits by 1-digit (grouping)		 Place value counters or plain counters can be used on a place value grid to support children to divide 4-digits by	Children can also draw their own counters and group them through a more pictorial method.	$8{,}532 \div 2 = 4{,}266$  Children should be encouraged to move away from the concrete and pictorial

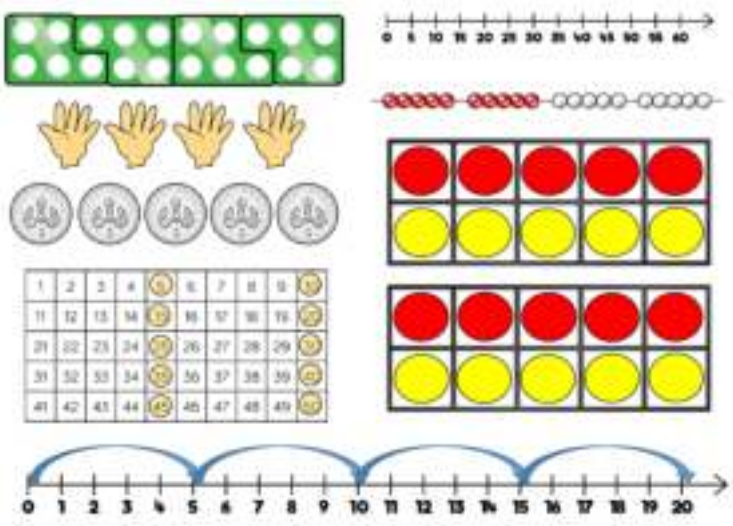
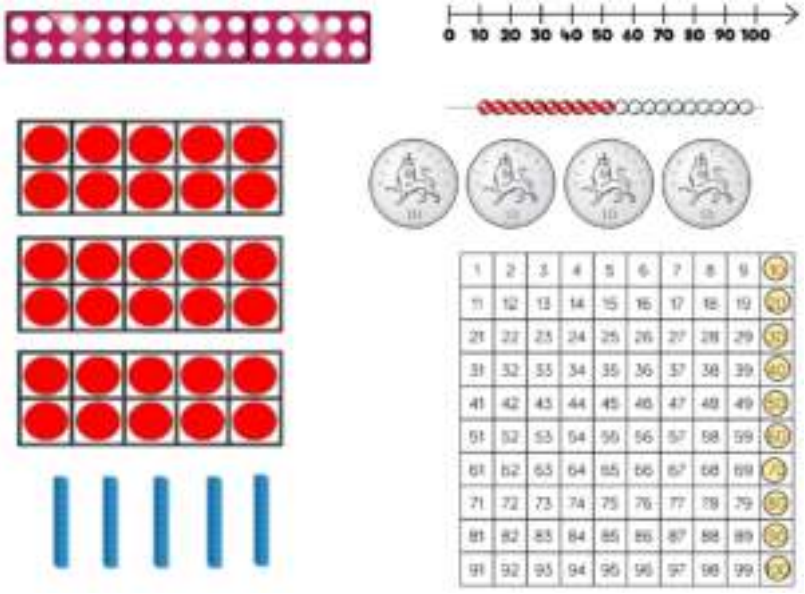
			1-digit		when dividing numbers with multiple exchanges.
6	Divide multi-digits by 2-digits (short division)	Written short division List of multiples			  When children begin to divide up to 4-digits by 2-digits, written methods become the most accurate as concrete and pictorial representations become less effective. Children can write our multiples to support their calculations with larger remainders. Children will also solve problems with remainders where the quotient can be rounded as appropriate.

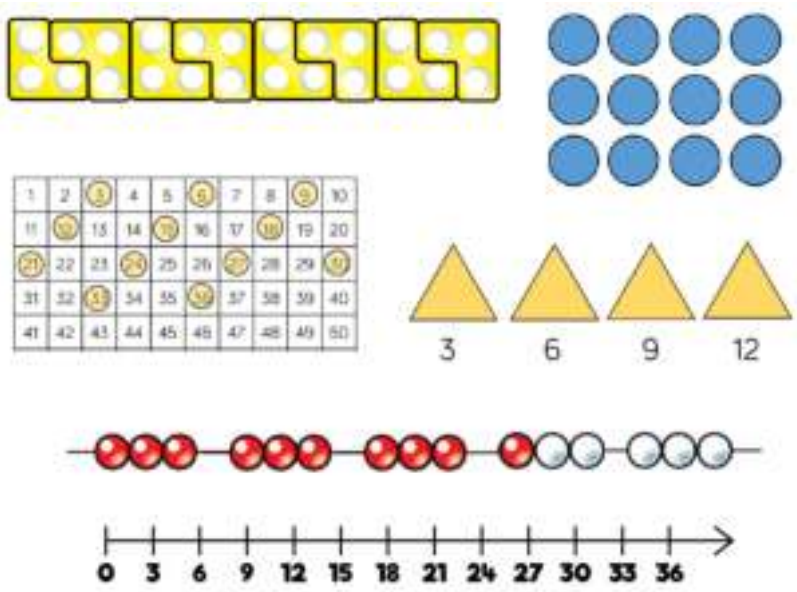
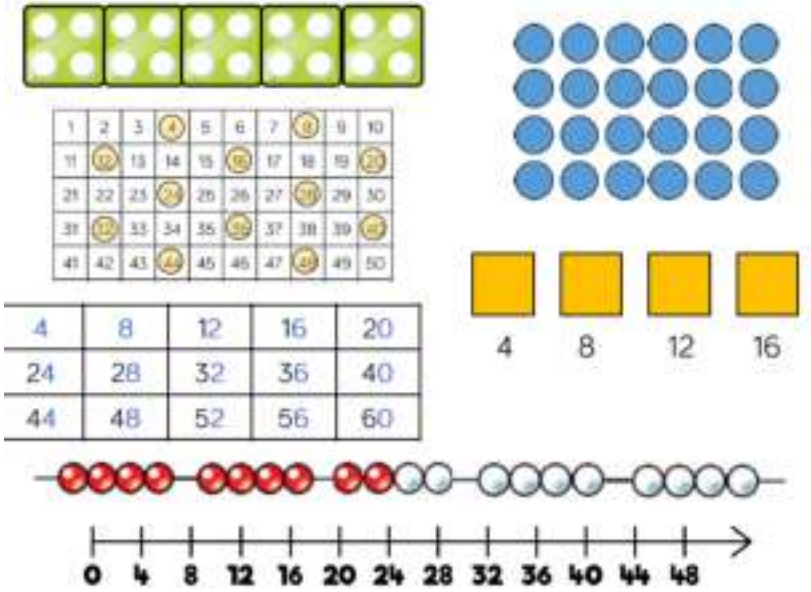
6	Divide multi-digits by 2-digits (long division) Divide multi-digits by 2-digits (long division)	Written short division List of multiples			 $432 \div 12 = 36$ $7{,}335 \div 15 = 489$  Children can write out multiples to support their calculations with larger remainders. Children will also solve problems with remainders where the quotient can be rounded as appropriate. $372 \div 15 = 24\ r12$   $372 \div 15 = 24\frac{4}{5}$ When a remainder is left at the end of a calculation, children can either leave it as a remainder or convert it to a fraction.

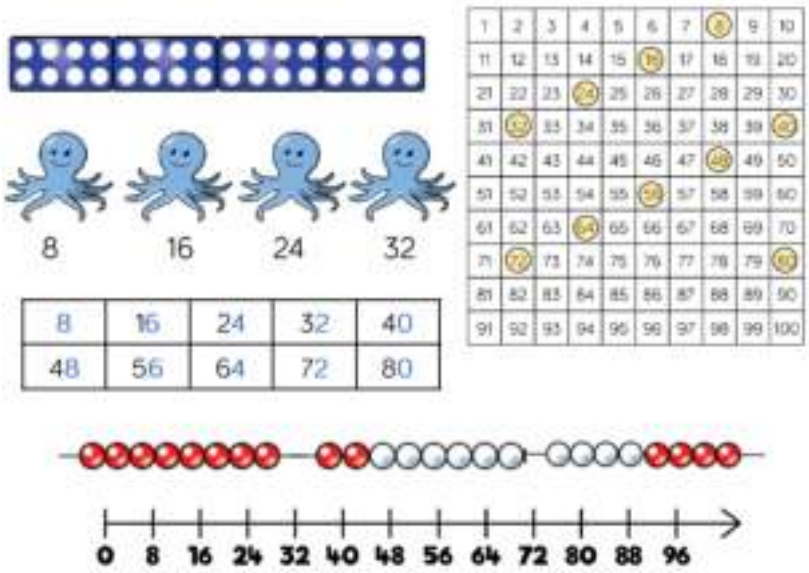
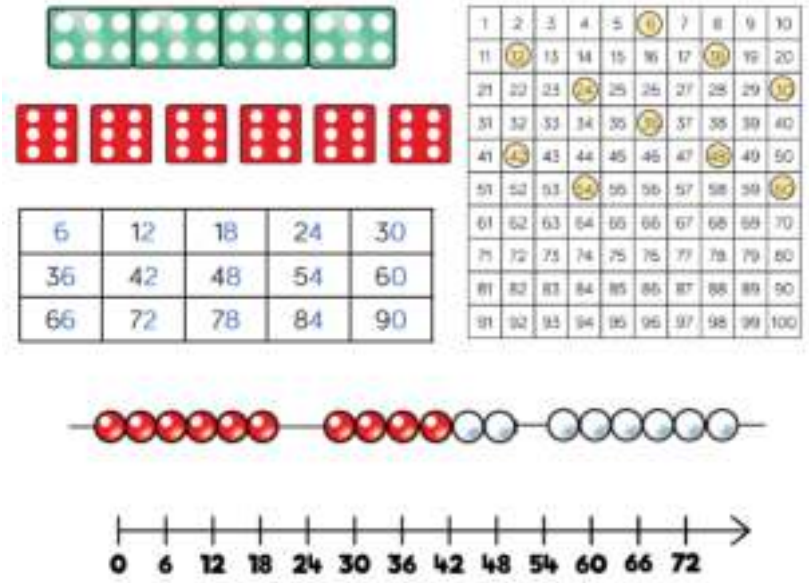
					This will depend on the context of the question. Children can also answer questions where the quotient needs to be rounded according to the context.

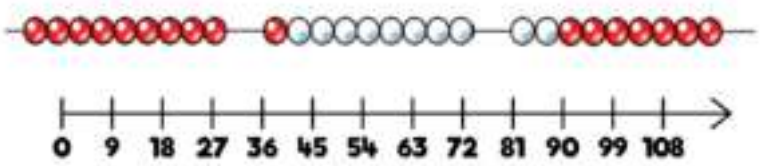
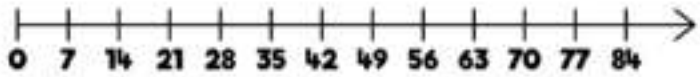
Times Tables

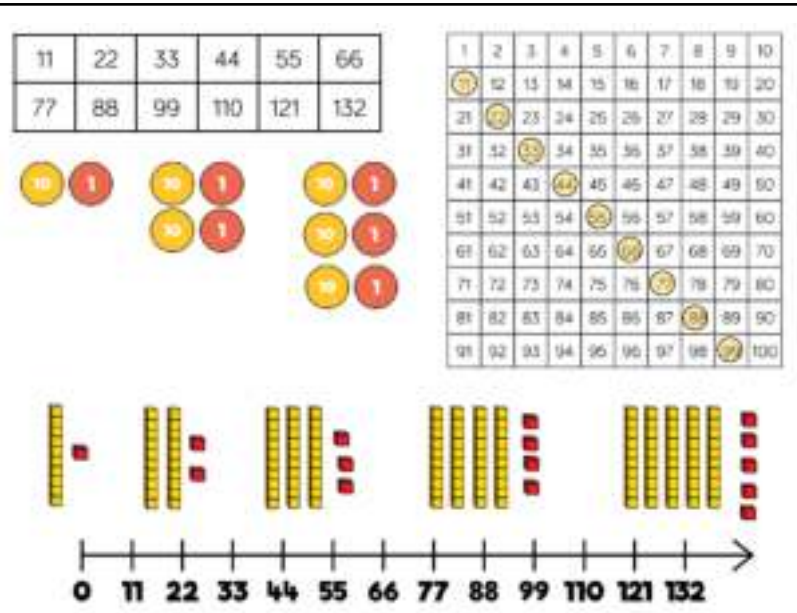
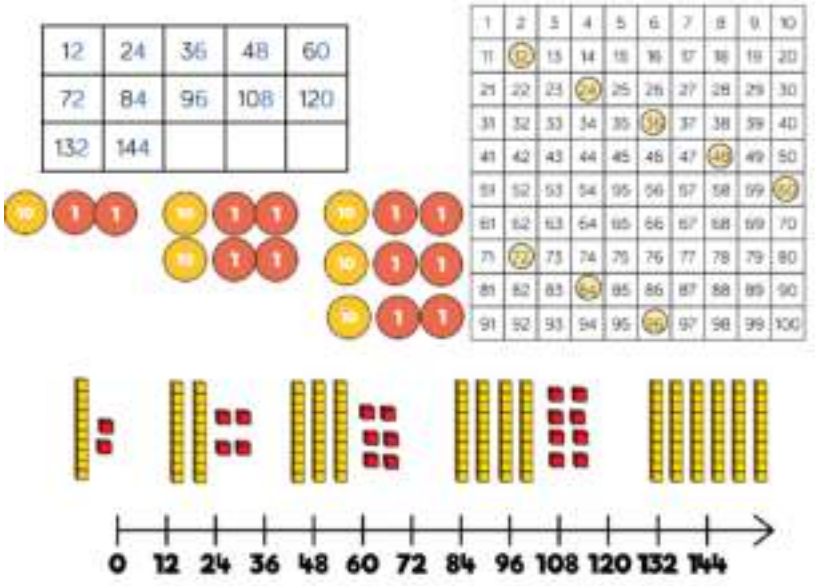
Year Group	Skill	Representations and Models		
2	Recall and use multiplication and division facts for the 2-times table	Bar Model Number shapes Counters Money Tens Frames Bead strings Number lines Everyday objects		Encourage daily counting in multiples both forwards and backwards. This can be supported using a number line or a hundred square. Look for patterns in the 2x tables, using concrete manipulatives to support. Notice how all the numbers are even and there is a pattern in the ones. Use different methods to develop fluency.

2	Recall and use multiplication and division facts for the 5-times table	Bar Model Number shapes Counters Money Tens Frames Bead strings Number lines Everyday objects		As above. Notice the pattern in the ones as well as highlighting the odd, even, odd, even pattern.
2	Recall and use multiplication and division facts for the 10-times table	Bar Model Number shapes Counters Money Tens Frames Bead strings Number lines Base 10		As above. Notice the pattern in the digits-the ones are always 0, and the tens increase by 1 ten each time.

3	Recall and use multiplication and division facts for the 3-times table	Hundred square Number shapes Counters Bead strings Number lines Everyday objects		As above. Notice the odd, even, odd, even, pattern using the number shapes to support. Highlight the pattern in the ones using a hundred square.
3	Recall and use multiplication and division facts for the 4-times table	Hundred square Number shapes Counters Bead strings Number lines Everyday objects		As above. Make links to the 2 times table, seeing how each multiple is double the twos. Notice the pattern in the ones within each group of five multiples. Highlight that all the multiples are even using number shapes to support.

3	Recall and use multiplication and division facts for the 8-times table	Hundred square Number shapes Counters Bead strings Number lines Everyday objects		As above. Make links to the 4 times table, seeing how each multiple is double the fours. Notice the pattern in the ones within each group of five multiples. Highlight that all the multiples are even using number shapes to support.
4	Recall and use multiplication and division facts for the 6-times table	Hundred square Number shapes Bead strings Number lines Everyday objects		As above. Make links to the 3 times table, seeing how each multiple is double the threes. Notice the pattern in the ones within each group of five multiples. Highlight that all the multiples are even using number shapes to support.

4	Recall and use multiplication and division facts for the 9-times table	Hundred square Number shapes Bead strings Number lines	  9 18 27 36 45 54 63 72 81 90  0 9 18 27 36 45 54 63 72 81 90 99 108	As above. Notice the pattern in the tens and ones using the hundred square to support as well as noting the odd, even pattern within the multiples.
4	Recall and use multiplication and division facts for the 7-times table	Hundred square Number shapes Bead strings Number lines	  7 14 21 28 35 42 49 56 63 70   0 7 14 21 28 35 42 49 56 63 70 77 84	There is no obvious pattern in the numbers, however they should already know several facts due to commutativity. Children can still see the odd, even pattern in the multiples using number shapes to support.

4	Recall and use multiplication and division facts for the 11-times table	Hundred square Base 10 Place value counters Number lines		As above. Notice the pattern in the tens and ones using the hundred square to support. Also consider the pattern after crossing 100.
4	Recall and use multiplication and division facts for the 12-times table	Hundred square Base 10 Place value counters Number lines		As above. Make links to the 6 times table, seeing how each multiple is double the sixes. Notice the pattern in the ones within each group of five multiples. The hundred square can support in highlighting this pattern.