

Newham Bridge Primary School

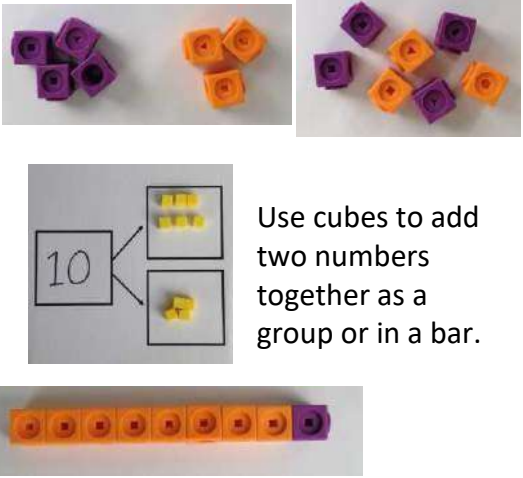
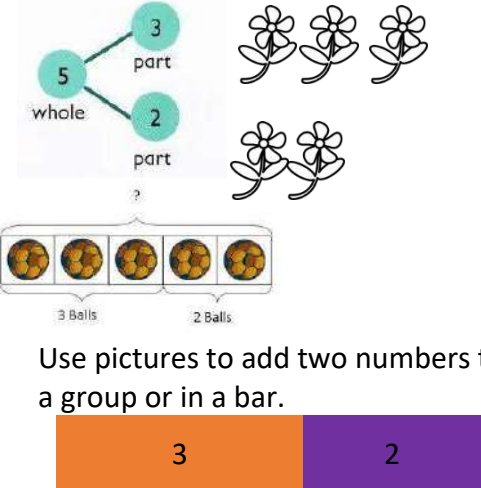
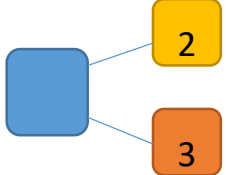

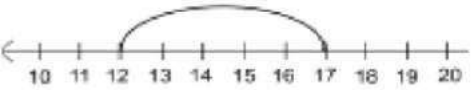
Calculation Policy for Mathematics

Spring 2026



Addition

Stage 1 – Add with numbers up to 20.

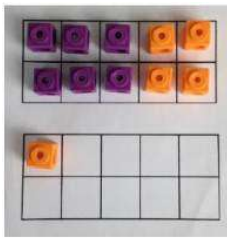
Objective & Strategy	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	 <p>Use cubes to add two numbers together as a group or in a bar.</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p>	$2 + 3 = 5$ $3 + 2 = 5$ $5 = 3 + 2$ $5 = 2 + 3$ 
Starting at the bigger number and counting on	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	 <p>$12 + 5 = 17$</p> <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	$5 + 12 = 17$ Place the larger number in your head and count on the smaller number to find your answer.

Regrouping to make 10.

This is an essential skill for column addition later.

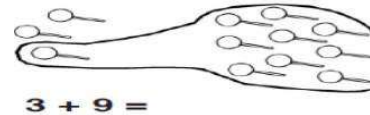


$$6 + 5 = 11$$

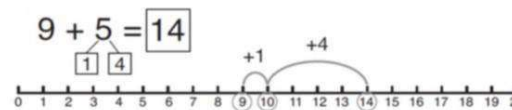


Start with the bigger number and use the smaller number to make 10.

Use ten frames.



Use pictures or a number line. Regroup or partition the smaller number using the part-part-whole model to make 10.



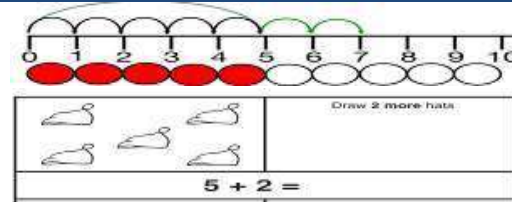
$$7 + 4 = 11$$

If I am at seven, how many more do I need to make 10. How many more do I add on now?

Represent & use number bonds and related subtraction facts within 20



2 more than 5.



Emphasis should be on the language

'1 more than 5 is equal to 6.'

'2 more than 5 is 7.'

'8 is 3 more than 5.'


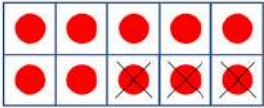
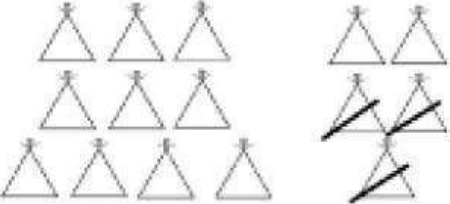


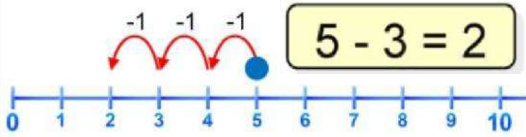
Key Vocabulary: add, plus, more, increase, altogether, combine, total, sum, equals, equal to, count on, number line, number bonds, part-whole model, tens frame, bar model

Key skills for addition at Stage 1:

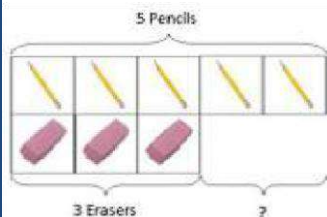
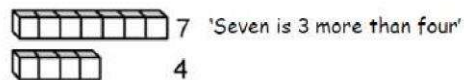
- Read and write numbers to 100 in numerals, including 1-20 in words
- Recall bonds to 10 and 20, and addition facts within 20
- Count to and across 100
- Count in multiples of 1, 2, 5 and 10
- Solve simple one-step problems involving addition, using objects, number lines and pictorial representations

Subtraction

Stage 1 – Subtract from numbers up to 20.

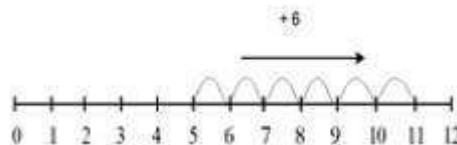
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Taking away ones.</p>	<p>Use physical objects, counters, cubes etc. to show how objects can be taken away.</p>  $4 - 2 = 2$  $10 - 3 = 7$	<p>Cross out drawn objects to show what has been taken away.</p>  $15 - 3 = 12$	$7 - 4 = 3$ $16 - 9 = 7$
<p>Counting back</p>	 <p>Move objects away from the group, counting backwards.</p>  <p>Make the larger number in your subtraction. Move the beads along the bead string as you count backwards.</p>	 $5 - 3 = 2$ <p>Count back in ones using a number line.</p>	<p>Put 13 in your head, count back 4. What number are you at?</p>

Find the
Difference

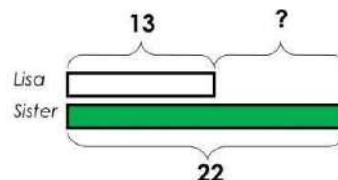


Compare objects and amounts.
Lay objects to represent bar model.

Count on using a number line to find the difference.



Lisa is 13 years old. Her sister is 22 years old.
Find the difference in age between them.



Draw bars to find the difference between 2 numbers.

$$13 - 5 = 8$$

$$8 = 13 - 5$$

$$13 - 8 = 5$$

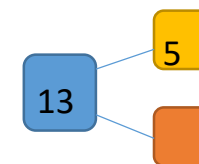
$$5 = 13 - 8$$

$$5 + 8 = 13$$

$$8 + 5 = 13$$

$$13 = 8 + 5$$

$$13 = 5 + 8$$



Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister?

Hannah has 8 goldfish. Helen has 3 goldfish. Find the difference between the number of goldfishes the girls have.

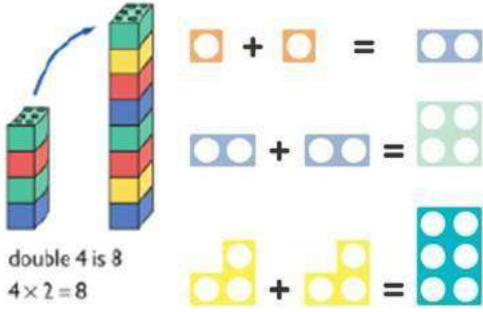
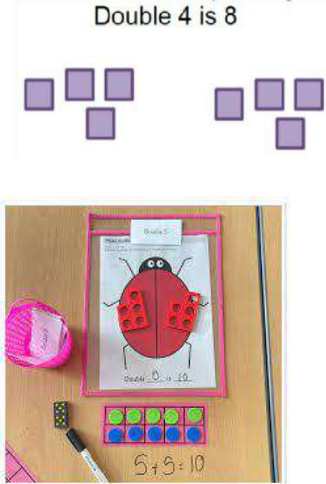


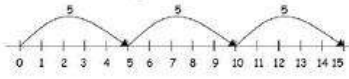
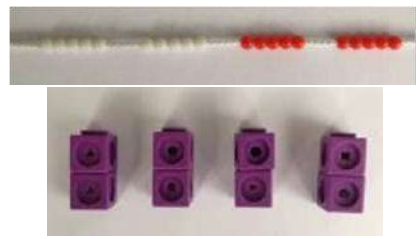
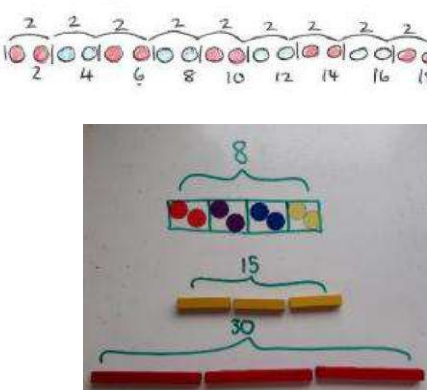
Key Vocabulary: subtract, less than, fewer than, more than, minus, difference, comparison, partitioning, reduction, take away, how many left? Decrease, remove, number line, tens frame, part-whole model, bar model

Key skills for addition at Stage 1:

- Recall and use number bonds and related subtraction facts to 20
- Add and subtract numbers to 20 mentally
- Add and subtract one digit and two-digit numbers to 30, using apparatus, written methods or pictures
- Solve subtraction problems using concrete objects and pictorial representation such as $7 = _ - 9$
- Read, write and interpret mathematical statements involving the subtraction (-) and equals (=) signs

Multiplication


Stage 1 – Multiply with concrete objects, arrays and pictorial representations.

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Doubling</p>	<p>Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling</p>  <p>double 4 is 8 $4 \times 2 = 8$</p>	<p>Draw pictures to show how to double numbers</p> <p>Double 4 is 8</p> 	<p>Write addition sentences to describe objects and pictures.</p>  <p>$2 + 2 + 2 = 6$</p> <p>There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?</p>  <p>$2 + 2 + 2 = 6$</p>  <p>$5 + 5 + 5 = 15$</p>
<p>Counting in multiples</p>	<p>Count the groups as children are skip counting, children may use their fingers as they are skip counting.</p> 	<p>Children make representations to show counting in multiples.</p> 	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>2, 4, 6, 8, 10</p> <p>5, 10, 15, 20, 25, 30</p>

Making equal groups and counting the total



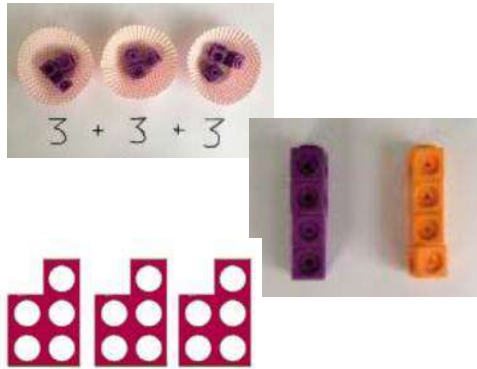
Use manipulatives to create equal groups.

Draw  to show $2 \times 3 = 6$

Draw and make representations

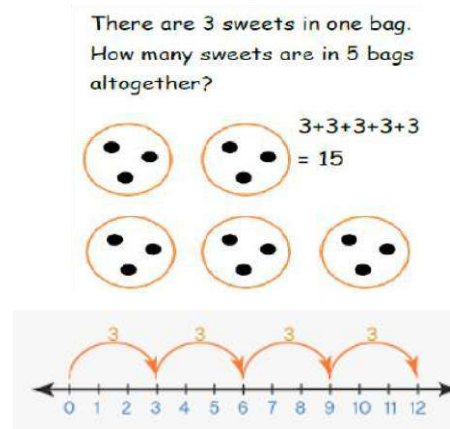
$$2 \times 4 = 8$$

Repeated addition



Use different objects to add equal groups

Use pictorial including number lines to solve problems

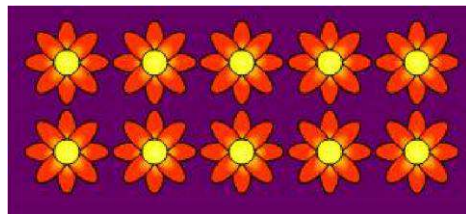


Write addition sentences to describe objects and pictures.

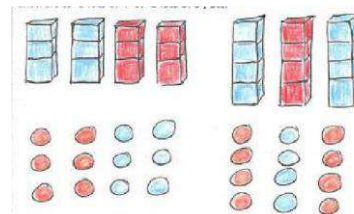


Understanding arrays

Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc.



Draw representations of arrays to show understanding



$$3 \times 2 = 6$$

$$2 \times 5 = 10$$

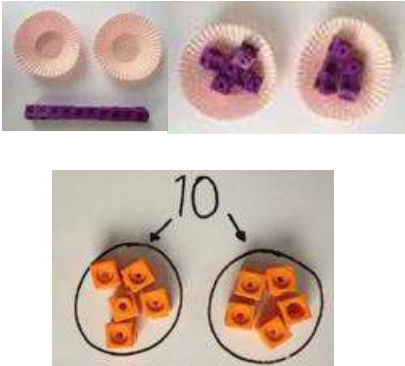
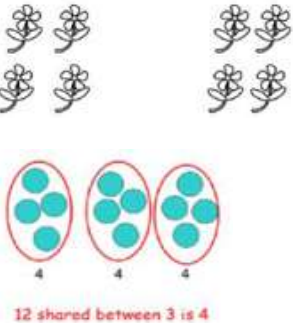

Key Vocabulary: repeated addition, groups of, lots of, times, multiplied by, array

Key skills for addition at Stage 1:

- Count in multiples of 2, 5 and 10
- Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- Make connections between arrays, number patterns, and counting in twos, fives and tens
- Begin to understand doubling using objects and pictorial representations

Division

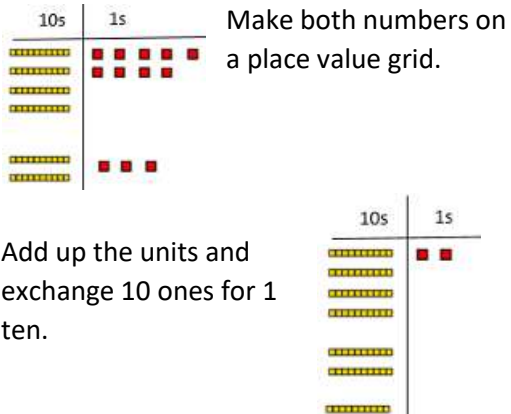
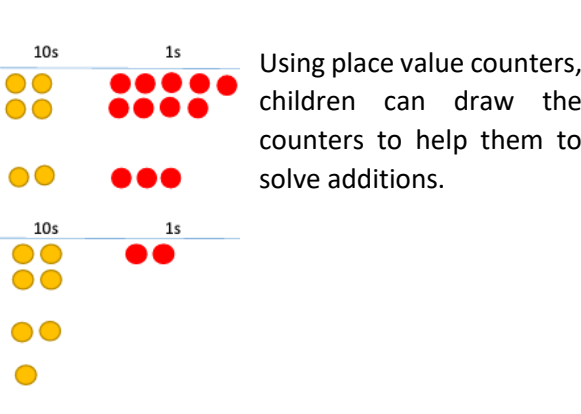
Stage 1 – Group and share small quantities

Objective & Strategy	Concrete	Pictorial	Abstract
Division as sharing	<p>I have 10 cubes, can you share them equally into two groups?</p> 	<p>Draw pictures to show how to share: 8 shared by 2 is 4.</p>  <p>I have shared 15 cubes into 3 equal groups.</p> 	<p>12 shared between 3 is 4. Share 8 buns between two people. $8 \div 2 = 4$</p>

Key Vocabulary: grouping, how many groups? Divided by, equal groups, sharing, array

Key skills for addition at Stage 1:

- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations, arrays with support of the teacher
- Through grouping and sharing small quantities, pupils begin to understand division and finding simple fractions of objects, numbers and quantities
- They make connections between arrays, number patterns and counting in 2s, 5s and 10s

<p>Column method with regrouping</p>	 <p>Make both numbers on a place value grid.</p> <p>Add up the units and exchange 10 ones for 1 ten.</p>	 <p>Using place value counters, children can draw the counters to help them to solve additions.</p>	$40 + 9$ $\underline{20 + 3}$ $60 + 12 = 72$
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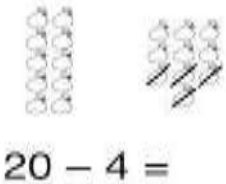
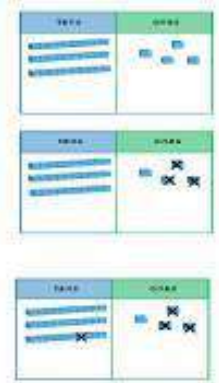

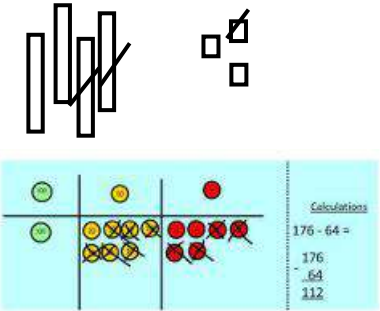
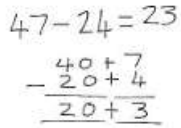

Key Vocabulary: add, total, sum, altogether, combine, plus, increase, more, equals, number line, place value counters, tens, ones, partition, column

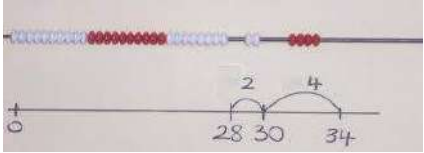
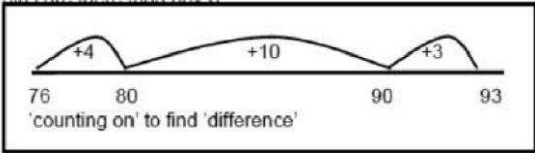

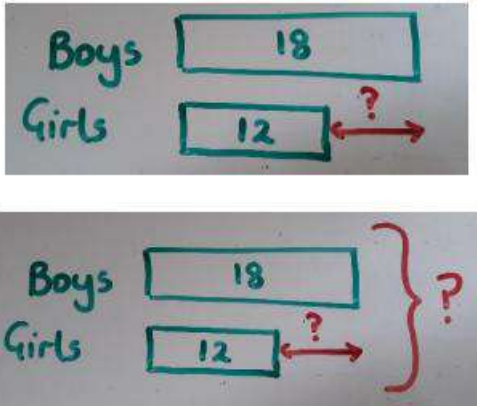
Key skills for addition at Stage 2:

- Add three single-digit numbers ($5 + 9 + 7$)
- Show that adding can be done in any order (the commutative law)
- Add a 2-digit number and ones ($24 + 5$)
- Add a 2-digit number and tens ($23 + 40$)
- Add a pair of 2-digit numbers ($35 + 47$)

Subtraction

Stage 2 – Subtract with 2-digit numbers

Objective & Strategy	Concrete	Pictorial	Abstract
Regroup a ten into ten ones	 <p>Use a Place Value chart to show how to change a ten into ten ones.</p>	 <p>$20 - 4 =$</p>	$20 - 4 = 16$
Partitioning to subtract without regrouping.	<p>$34 - 13 = 21$</p> <p>Use Base 10 or place value counters to show how to partition the number when subtracting without regrouping.</p>  	<p>Draw the Base 10 or place value counters alongside the written calculation to help to show working.</p> <p>$43 - 21 = 22$</p> 	<p>$47 - 24 = 23$</p>  <p>This will lead to clear written column subtraction.</p> 

<p>Make ten strategy</p> <p><i>Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.</i></p>	 <p style="text-align: center;">$34 - 6 = 28$</p> <p>Use a bead string to model counting to next ten and the rest.</p>	 <p>Use a number line to count on to next ten and then the rest.</p> <p style="text-align: center;">$93 - 76 = 17$</p>	<p>$93 - 76 = 17$</p>
<p>Finding the difference</p>	 <p>What's the difference between 10 and 6? The difference between 10 and 6 is ____ $10 - 6 = \underline{\quad}$</p> <p>Use concrete apparatus in linear formation to compare the sizes.</p> <p>Identify the gap representing the difference. Discuss how many more / how many less.</p>	 <p>Use comparison continuous models to find the difference and also to find the whole.</p> <p>How many more boys are there in the class than girls? Discuss all the information we know: There are 18 boys, 12 girls; There are 30 in total; There are 6 more boys; There are 6 fewer girls.</p>	<p>Find the difference between 66 and 100.</p> <p>How would you identify the difference between 64 and 21?</p> <p><i>Promote independence: Children given ownership to apply the strategy they believe is best suited to solve the problem.</i></p>

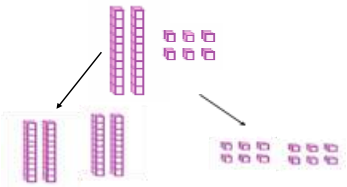
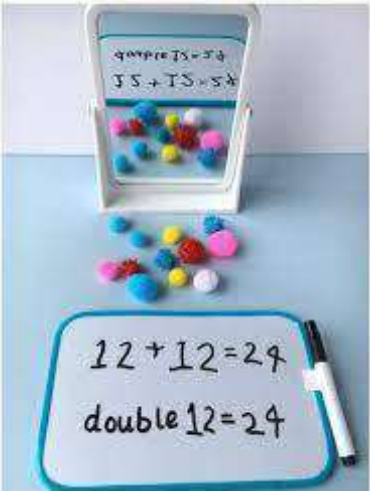
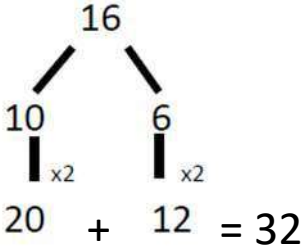

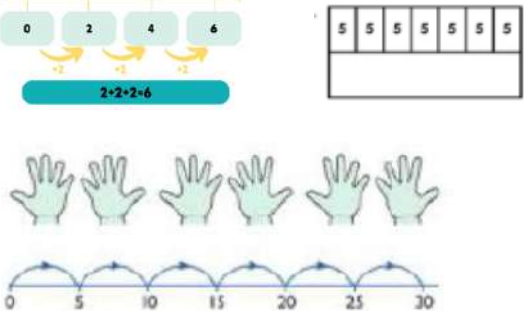
Key Vocabulary: subtract, less than, fewer than, more than, minus, difference, comparison, partitioning, reduction, take away, how many left?
Decrease, remove, number line, partition, place value counters, hundreds, tens, ones, column

Key skills for addition at Stage 2:

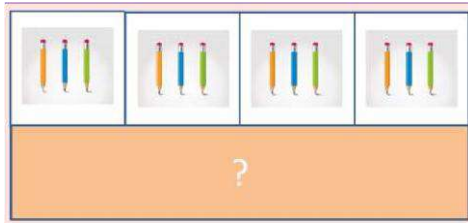
- Recall and use number bonds and related subtraction facts to 20
- Add and subtract numbers to 20 mentally
- Add and subtract one digit and two-digit numbers to 30, using apparatus, pictures or written methods
- Solve subtraction problems using concrete objects and pictorial representation such as $7 = _ - 9$
- Read, write and interpret mathematical statements involving the subtraction (-) and equals (=) symbols

Stage 2 – Multiply using arrays and repeated addition

Multiplication

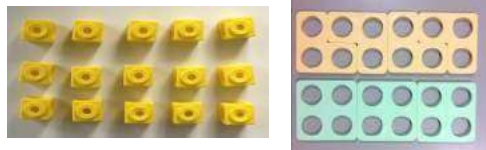
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Doubling</p>	<p>Model doubling using Base 10 and Place value counters.</p> $26 + 26 = \underline{\quad}$ <p>Double 26 is $\underline{\quad}$</p> $26 \times 2 = \underline{\quad}$  $40 + 12 = 52$	<p>Draw pictures and representations to show how to double numbers</p> 	<p>Partition a number and then double each part before recombining it back together.</p> 
<p>Counting in multiples of 2, 5, 10 from 0 (repeated addition)</p>	<p>Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models.</p> 	<p>Number lines, counting sticks and bar models should be used to show representation of counting in multiples.</p> 	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>0, 2, 4, 6, 8, 10</p> <p>0, 5, 10, 15, 20, 25, 30</p> <p>$8 \times 2 = \square$</p> <p>$5 \times 3 = \square$</p>

$$5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40$$

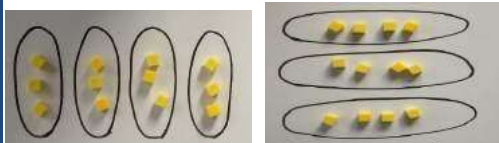


Multiplication is commutative

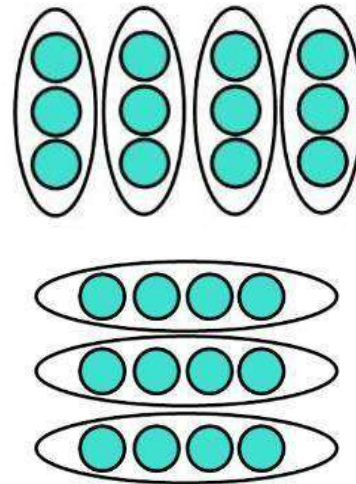
Create arrays using counters and cubes and Numicon.



Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.



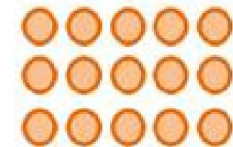
Use representations of arrays to show different calculations and explore commutativity.



$$12 = 3 \times 4$$

$$12 = 4 \times 3$$

Use an array to write multiplication sentences and reinforce repeated addition.



$$5 + 5 + 5 = 15$$

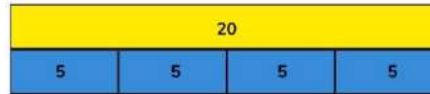
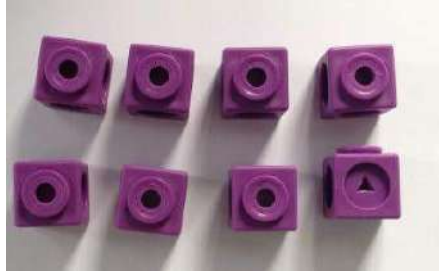
$$3 + 3 + 3 + 3 + 3 = 15$$

$$5 \times 3 = 15$$

$$3 \times 5 = 15$$

Using the Inverse
This should be taught alongside division, so pupils learn how they work alongside each other.

$$4 \times 2 = 8$$
$$2 \times 4 = 8$$
$$8 \div 4 = 2$$
$$8 \div 2 = 4$$



$$4 \times 5 = 20$$
$$5 \times 4 = 20$$
$$20 \div 4 = 5$$
$$20 \div 5 = 4$$

$$2 \times 4 = 8$$
$$4 \times 2 = 8$$
$$8 \div 2 = 4$$
$$8 \div 4 = 2$$
$$8 = 2 \times 4$$
$$8 = 4 \times 2$$
$$2 = 8 \div 4$$
$$4 = 8 \div 2$$

Show all 8 related fact family sentences.

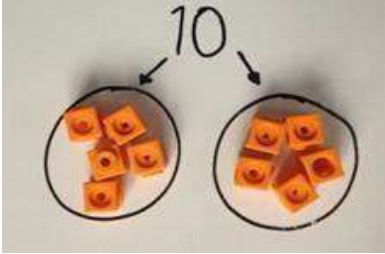
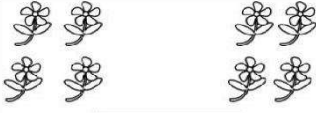
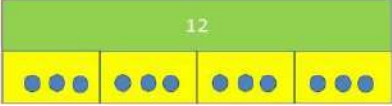
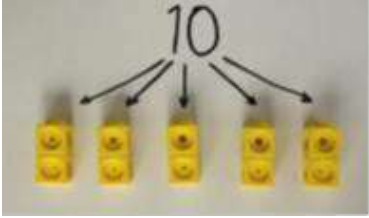
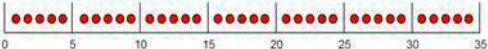

Key Vocabulary: repeated addition, groups of, lots of, times, multiplied by, array, times tables, multiplication and division facts, commutative, inverse, division, divide


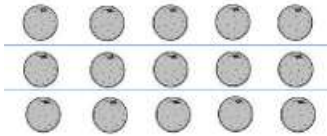
Key skills for addition at Stage 2:

- Count in steps of 2, 3 and 5 from zero, and in 10s from any number
- Recall and use multiplication facts from the 2, 5 and 10 multiplication tables, including recognising odd and even
- Write and calculate number statements using x and = symbols
- Show that multiplication can be done in any order (commutative)
- Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts
- Pupils use a variety of language to discuss and describe multiplication

Division

Stage 2 - Group and share using divide and equals

Objective & Strategy	Concrete	Pictorial	Abstract
Division as sharing	 <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p>  $8 \div 2 = 4$ <p>Children use bar modelling to show and support understanding.</p>  $12 \div 4 = 3$	$12 \div 3 = 4$
Division as grouping	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p>  	<p>Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.</p>  $20 \div 5 = ?$ $5 \times ? = 20$	$21 \div 3 = 7$ <p>Divide 21 into 3 groups. How many are in each group?</p>

<p>Division with arrays</p>	<p>Link division to multiplication by creating an array and thinking about the number sentences that can be created.</p>  <p>Eg $15 \div 3 = 5$ $5 \times 3 = 15$ $15 \div 5 = 3$ $3 \times 5 = 15$</p>	<p>Draw an array and use lines to split the array into groups to make multiplication and division sentences.</p> 	<p>Find the inverse of multiplication and division sentences by creating four linking number sentences.</p> <p>$5 \times 3 = 15$ $3 \times 5 = 15$ $15 \div 5 = 3$ $15 \div 3 = 5$</p>
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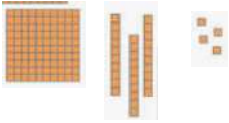
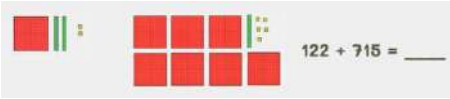
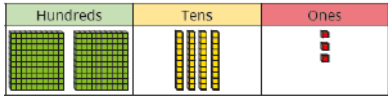
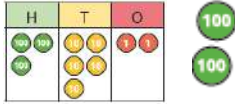
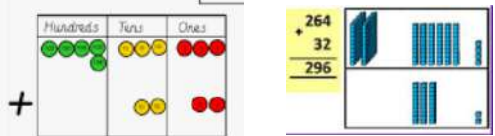

Key Vocabulary: grouping, how many groups? Divided by, equal groups, sharing, array, divide, division, bar model, number line, inverse, multiplication, multiply

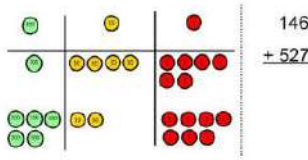
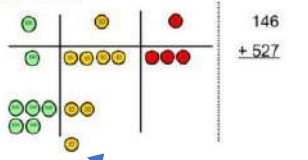
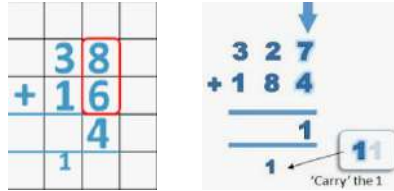
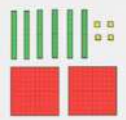
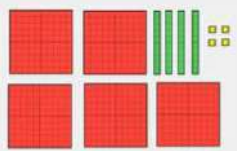
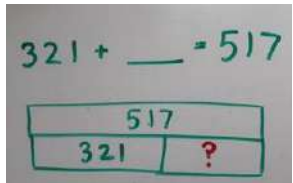
Key skills for addition at Stage 2:

- Count in steps of 2, 3, and 5 from 0
- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- Calculate mathematical sentences for multiplication and division within the multiplication tables and write them using the \times , \div and $=$ symbols
- Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Addition

Stage 3- Add with up to 3-digit numbers

Objective & Strategy	Concrete	Pictorial	Abstract
Add 1s, 10s and 100s No regrouping	Use a variety of HTO practical resources to add 1s, 10s and 100s. See the connections between the HTO columns.  	Pictorial representation of $243 + 5 =$ using a place value chart with hundreds, tens, and ones columns.  $352 + 200 =$  Use Place Value charts to draw and represent adding 1s, 10s, and 100s.	Abstract equations: $56 + 3 =$ $124 + 5 =$ $54 + 10 =$ $142 + 20 =$ $156 + 200 =$
Column method- without regrouping	Add together the ones first, then add the tens. Use the Base 10 blocks first before moving onto place value counters. Recap adding in columns. 	Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.	Children set columns out in their book- 1 digit per square. 

<p>Column method with regrouping</p>	<p>Make both numbers on a place value grid.</p>  <p>Add up the units and exchange 10 ones for 1 ten.</p>  <p>Use Place Value counters to do this practically. Add units first. Carry numbers underneath.</p>	<p>Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.</p>	<p>Add units first.</p> <p>Carry numbers underneath the bottom line.</p> <p>Remind children of correct vocabulary, e.g. the real value is twenty add fifty</p> 				
<p>Application of addition and its inverse</p>	 <p>+ ____ =</p>  <table border="1" data-bbox="380 909 683 989"> <tr> <td colspan="2">544</td> </tr> <tr> <td>264</td> <td>?</td> </tr> </table> <p>Make connections between concrete resources and pictorial.</p>	544		264	?	 <p>Applying knowledge of bar models and inverse operations to solve missing number problems.</p>	<p>$37 + _ + 23 = 100$</p> <p>$315 = _ + 114$</p> <p>$81 + _ = 213$</p>
544							
264	?						

Key Vocabulary: add, addition, total, sum, altogether, combine, plus, increase, more, count on, equals, number line, place value counters, hundreds, tens, ones, partition, column, boundary, expand, carry


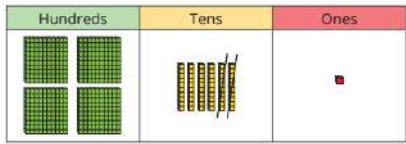
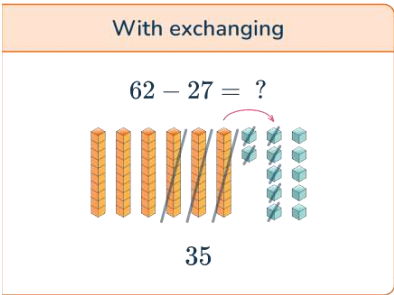
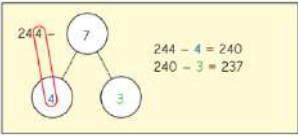
Key skills for addition at Stage 3:

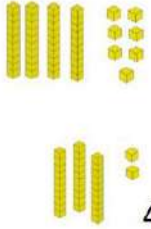
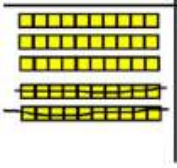
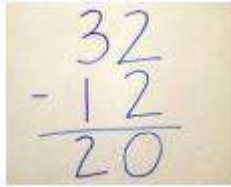








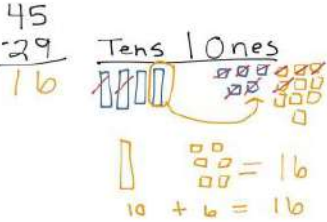
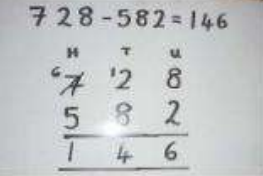




- Read and write numbers to 1000 in numerals and words.
- Use mental methods to mentally add numbers with up to 3 digits.
- Add numbers with up to 3 digits using formal written methods, including regrouping.
- Estimate answers to calculations, using inverse to check answers.

- Solve problems, including missing number and missing symbol problems.

Subtraction

Stage 3 – Subtract with 2 and 3-digit numbers

Objective & Strategy	Concrete	Pictorial	Abstract
Subtract numbers mentally (up to 3-digits) No exchange	Use a variety of resources to support 100 squares, number lines etc Use patterns building on previous learning.	Use Place value charts- make links to the different columns and patterns we notice.  $534 - 2 = \underline{\quad}$ $461 - 20 = \underline{\quad}$ 	$534 - 2 =$ $461 - 20 =$ $763 - 300 =$
Subtract numbers (up to 3-digits) With an exchange.	Use Base 10 to practically exchange 	Use part whole models to partition in order to subtract: 	$244 - 7 =$ $920 - 50 =$

<p>Column subtraction without exchange</p>	 <p>47—32</p> <p>Use base 10 or Numicon to model</p>	 $\begin{array}{r} 54 \\ -22 \\ \hline 32 \end{array}$ <p>Draw representations to support understanding</p>	 $\begin{array}{r} 32 \\ -12 \\ \hline 20 \end{array}$ $\begin{array}{r} 569 \\ -315 \\ \hline \end{array}$						
<p>Column subtraction with exchange</p>	<p>Use base 10 and formal written method side by side to support understanding of the exchange process</p> <table border="1" data-bbox="450 608 712 805"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table> $\begin{array}{r} 47 \\ -29 \\ \hline 18 \end{array}$	Tens	Ones					 <p>Children may draw base ten or PV counters and cross off.</p>	 <p>Then move to formal method.</p>
Tens	Ones								
									
									


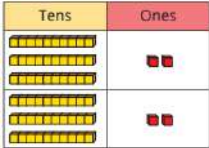
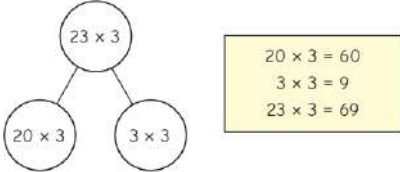


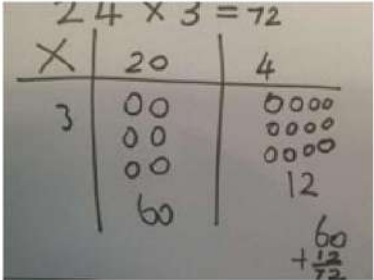
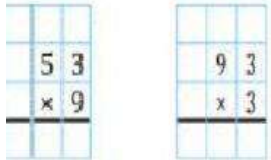
Key Vocabulary: subtract, less than, fewer than, more than, minus, difference, comparison, partitioning, reduction, take away, how many left? decrease, remove, number line, partition, place value counters, hundreds, tens, ones, column

Key skills for addition at Stage 3:

- Subtract mentally a 3-digit number and ones, 3-digit number and tens, 3-digit number and hundreds
- Estimate answers and use inverse operations to check
- Solve problems, including missing number problems
- Find 10 or 100 more or less than a given number
- Recognise the place value of each digit in a 3-digit number
- Counting up differences as a mental strategy when numbers are close together or near multiples of 10
- Read and write numbers up to 1000 in numerals and words

Multiplication

Stage 3 – Multiply 2-digit numbers by a 1-digit number using more formal methods

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Multiply a 2digit number by a 1-digit number</p> <p>No exchange</p>	<p>Use Place Value counters and Base 10 to practically put into equal groups</p> <p>$21 \times 4 =$</p>  <p>$32 \times 2 =$</p>  <p>3 tens $\times 2 =$ ____ tens 2 ones $\times 2 =$ ____ ones ____ + ____ = ____ $32 \times 2 =$ ____</p>	<p>Use Part whole models to partition to multiply</p> 	<p>Column multiplication to multiply</p> 
<p>Multiply a 2digit number by a 1-digit number</p> <p>With an exchange</p>	<p>Use PV counters and Base 10 to practically multiply 2-digit numbers.</p> <p>Use the place value chart and counters to work out 45×3</p>  <p>4 tens $\times 3 =$ ____ tens 5 ones $\times 3 =$ ____ ones ____ + ____ = ____ $45 \times 3 =$ ____</p>	<p>Children can represent their work with place value counters in a way that they understand.</p> <p>They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below.</p> 	<p>Move onto column multiplication</p> 


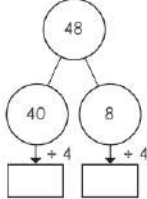
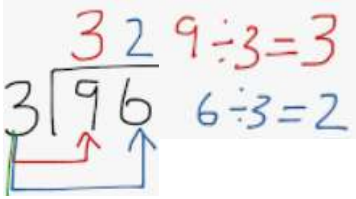
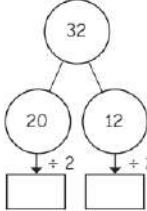
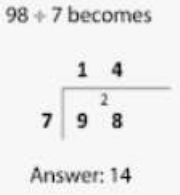
Key Vocabulary: repeated addition, groups of, lots of, times, multiplied by, array, times tables, multiplication and division facts, commutative, inverse, division, divide, product, part whole, column multiplication, partitioning

Key skills for multiplication at Stage 3:

- Recall multiplication facts for the 2, 3, 4, 5, 8 and 10 multiplication tables, and multiply multiples of 10.
- Write and calculate number statements using the multiplication tables they know, including 2-digit x 1-digit, drawing upon mental methods, and progressing to reliable written methods.
- Solve multiplication problems, including missing number problems.
- Develop mental strategies using commutativity (e.g. $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$)
- Solve simple problems in contexts, deciding which operations and methods to use.
- Develop efficient mental methods to solve a range of problems e.g. using commutativity and missing number problems

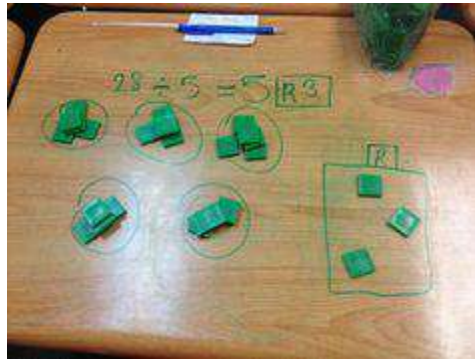
Division

Stage 3 – divide a 2-digit number by a 1-digit number- dividing when remainders occur

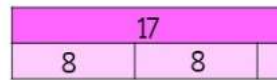
Objective & Strategy	Concrete	Pictorial	Abstract																
<p>Divide a 2-digit number by 1-digit number</p> <p>No exchange</p>	<p>Use counters, Base 10, classroom objects to share equally into groups to divide</p> <p>There are 63 crayons.</p>  <p>▶ Share the crayons into three equal groups.</p> <p>Move onto setting out on a Place Value table.</p> <p>Dani uses place value counters to work out $39 \div 3$</p> <table border="1" data-bbox="479 770 712 933"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>9</td> </tr> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>$39 \div 3 = 13$</p>	Tens	Ones	3	9	1	3	0	0	<p>Use a part whole model to partition to divide.</p> <p>Eva uses a part-whole model to work out $48 \div 4$</p> <p>Complete Eva's workings.</p>  <p>$48 \div 4 = \underline{\quad}$</p>	<p>$84 \div 4$ $66 \div 2$ $66 \div 3$ $69 \div 3$</p> 								
Tens	Ones																		
3	9																		
1	3																		
0	0																		
<p>Divide a 2-digit number by a 1-digit number</p> <p>With an exchange</p>	<p>Use Place Value counters, base 10 and a PV chart to help sharing into equal groups, then exchanging the left-over counters/items.</p> <p>Ron uses place value counters to work out $42 \div 3$</p> <p>First, he shares the tens into 3 equal groups.</p> <p>He has 1 ten and 2 ones left over.</p> <table border="1" data-bbox="562 1193 752 1289"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2</td> </tr> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>Ron exchanges the remaining ten for 10 ones.</p> <p>Then he shares the ones into 3 equal groups.</p> <table border="1" data-bbox="562 1342 725 1433"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12</td> </tr> <tr> <td>0</td> <td>4</td> </tr> <tr> <td>0</td> <td>4</td> </tr> </tbody> </table> <p>$42 \div 3 = 14$</p>	Tens	Ones	1	2	0	0	0	0	Tens	Ones	1	12	0	4	0	4	<p>Build on the step above by partitioning into divisible numbers.</p> <p>Annie uses a part-whole model to work out $32 \div 2$</p>  <p>$32 \div 2 = \underline{\quad}$</p>	<p>What strategies do children know and can apply?</p> <p>$48 \div 3$ $52 \div 4$ $65 \div 5$ $72 \div 6$</p> <p>$98 \div 7$ becomes</p>  <p>Answer: 14</p>
Tens	Ones																		
1	2																		
0	0																		
0	0																		
Tens	Ones																		
1	12																		
0	4																		
0	4																		

Divide with remainders

Recap sharing into equal groups using a range of practical objects.

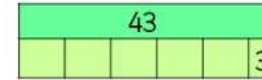


Use a bar model to divide known multiplication facts with remainders



$$17 = 8 \times \underline{\quad} + 1$$

$$17 \div 2 = \underline{\quad} \text{ remainder } \underline{\quad}$$



$$43 = \underline{\quad} \times 5 + 3$$

$$43 \div 5 = \underline{\quad} \text{ remainder } 3$$

$76 \div 3$

$62 \div 5$

$58 \div 4$

$83 \div 6$

432 ÷ 5 becomes

$$\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$$

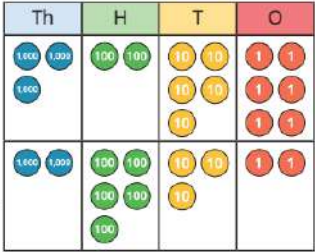
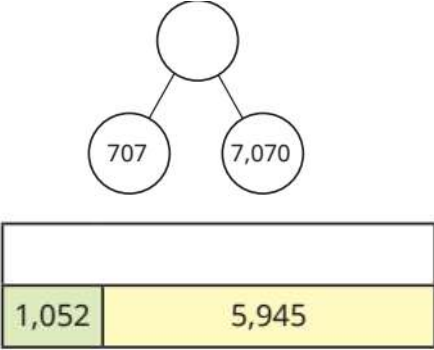
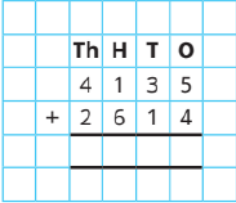
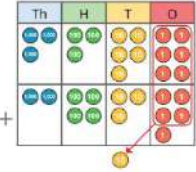
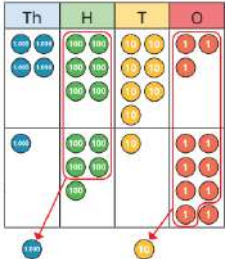
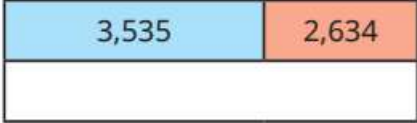
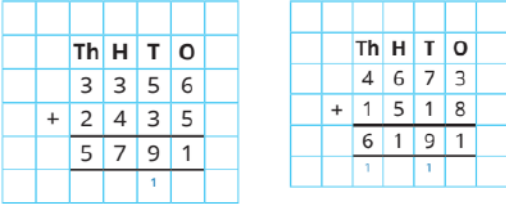
Key Vocabulary: grouping, how many groups? Divided by, equal groups, sharing, array, divide, division, bar model, number line, part-whole inverse, commutative, short division, exchange, remainders

Key skills for Division at Stage 3:

- Recall and use multiplication and division facts for the 2, 3, 4, 5, 8 and 10 multiplication tables (through doubling, connect 2, 4 and 8).
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods.
- Solve problems, in contexts, and including missing number problems, involving multiplication and division.
- Pupils develop efficient mental methods, for example, using multiplication and division facts to derive related facts.
- Pupils develop reliable written methods for division, starting with calculation of 2-digit numbers by 1-digit.

Addition

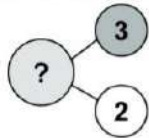
Stage 4- Add with up to 4-digit numbers

Objective & Strategy	Concrete	Pictorial	Abstract
Add up to 4-digit numbers No exchange	Use Place Value counters or Base 10 and a Place Value chart to practically organise and add. $3,256 + 2,532 =$ 	Use Part-whole models and bar models, make explicit the connection between the two diagrams through labelling. 	
Add up to 4-digit numbers with an exchange	Start with 1 exchange. Model exchanging 10 ones for 1 ten and carrying it over.  $4,673 + 1,518$  Then build up to more than 1 exchange	Build on learning by using bar models to make the connection with related facts. $3535 + 2634 = \underline{\quad}$ $2634 + 3535 = \underline{\quad}$ $\underline{\quad} - 2634 = 3535$ $\underline{\quad} - 3535 = 2634$ 	After working using practical representations, model how to set out in written form. 

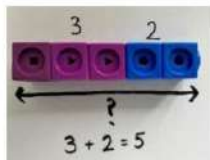
Understanding aggregation and augmentation

Aggregation (two quantities (parts) combined)

Three yellow sweets and two red sweets are on the table. How many sweets are on the table?

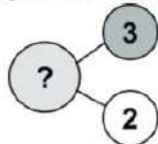


Three and two equals five.

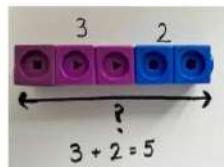


Augmentation (one quantity is increased by a provided amount)

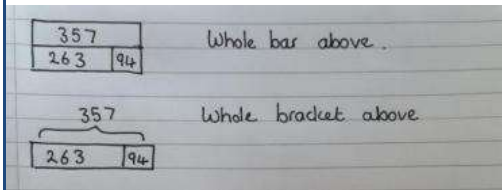
There were three sweets on the table. Two more have been put on. How many sweets are on the table now?



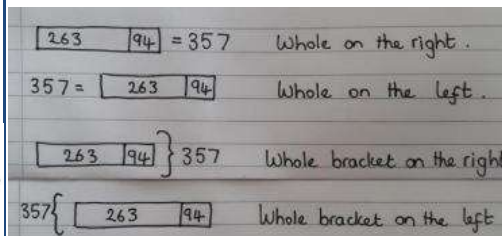
Two more than three is five.



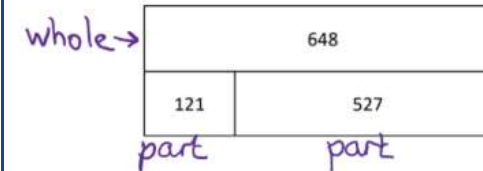
Aggregation:



Augmentation:



Understanding the relationship between bar models and the two models of addition.



Using bar models to link knowledge of part-part-whole.

$$121 + 527 = 648$$

$$527 + 121 = 648$$

Make a link to the inverse operation (subtraction) if children are ready:

$$648 - 121 = 527$$

$$648 - 527 = 121$$

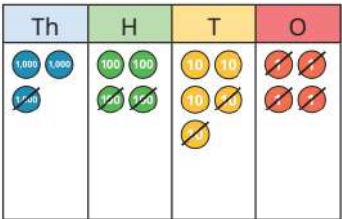
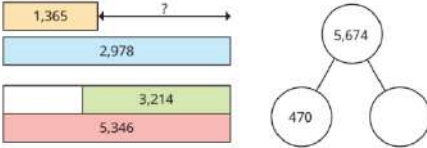
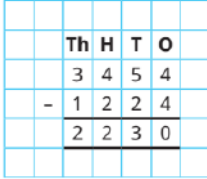
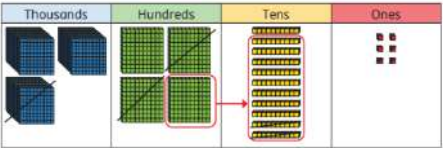
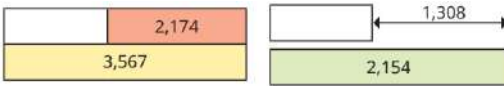
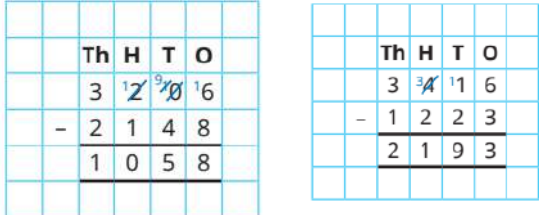
Key Vocabulary: add, addition, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, sum, thousands, hundreds, tens, ones, partition, column addition, increase, ascending, boundary, expand, inverse

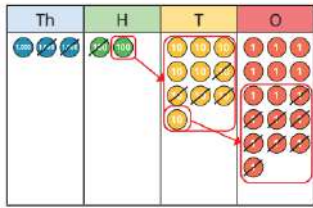
Key skills for addition at Stage 4:

- Select most appropriate method: mental, jottings or written and explain why.
- Recognise the place value of each digit in a 4-digit number.
- Round any number to the nearest 10, 100 or 1000.
- Estimate and use inverse operations to check answers.
- Solve 2-step problems in context, deciding which operations and methods to use and why.
- Find 1000 more or less than a given number.
- Continue to practise a wide range of mental addition strategies i.e. number bonds, add the nearest multiple and adjust, use near doubles, partitioning and recombining.
- Add numbers with up to 4-digits using the formal written method of column addition.

Subtraction

Stage 4 – Subtract up to 4-digit numbers

Objective & Strategy	Concrete	Pictorial	Abstract
Subtract two 4-digit numbers No exchange	Use Place Value counters or Base 10 and a Place Value chart. $3,454 - 1,224 =$  Model crossing off the counters to find answers.	Use pictorial strategies to model subtraction- Part-whole and bar models to make an explicit connection with prior learning 	Build on previous learning and model setting out using column subtraction 
Subtract two 4-digit numbers with an exchange	Start with one exchange- using counters and PV charts $3,416 - 1,223 =$  Model exchanging. Then move onto more than one exchange $3,206 - 2,148 =$	Use part whole models and bar models 	Build up to setting out using formal written methods 



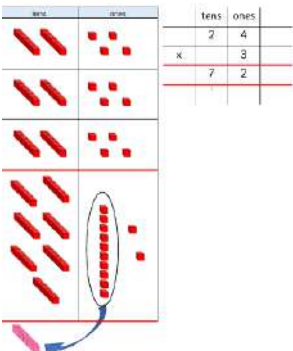
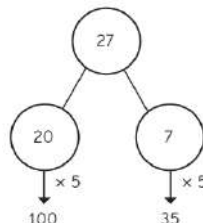
Key Vocabulary: subtract, less than, fewer than, more than, minus, difference, comparison, partitioning, reduction, take away, how many left? Decrease, remove, number line, partition, place value counters, thousands, hundreds, tens, ones, column subtraction, exchange

Key skills for subtraction at Stage 4:

- Subtract by counting on where numbers are close together or they are near to multiples of 10, 100 or 1000.
- Children select the most appropriate and efficient methods for given subtraction calculation.
- Estimate and use inverse operations to check answers.
- Solve addition and subtraction 2-step problems, choosing which operations and methods to use and why.
- Solve simple measure and money problems involving fractions and decimals to two decimal places.
- Find 1000 more or less than a given number.
- Count backwards through zero, including negative numbers.
- Recognise place value of each digit in a 4-digit number then round any number to the nearest 10, 100 or 1000.
- Solve number and practical problems that involve the above, with increasingly large positive numbers.

Stage 4 – Multiply 2 and 3- digit numbers by a 1-digit number, using all multiplication tables up to 12 x 12



Multiplication

Objective & Strategy	Concrete	Pictorial	Abstract																																																		
<p>Multiply a 2-digit number by a 1-digit number</p>	<p>Recap and develop on Y3 learning</p> <p>Use counters and Place Value charts to practically sort into equal groups</p> <p style="text-align: center;">$24 \times 3 =$</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #ffffcc;">Tens</th> <th style="background-color: #ffcccc;">Ones</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10 10</td> <td style="text-align: center;">1 1 1 1</td> </tr> <tr> <td style="text-align: center;">10 10</td> <td style="text-align: center;">1 1 1 1</td> </tr> <tr> <td style="text-align: center;">10 10</td> <td style="text-align: center;">1 1 1 1</td> </tr> </tbody> </table>	Tens	Ones	10 10	1 1 1 1	10 10	1 1 1 1	10 10	1 1 1 1	<p>Set out using Base 10 or PV counters and explain what to do when we need to exchange.</p>  <p>Also use part-whole models. Link to place value and partitioning to help multiply.</p> <p>$27 \times 5 =$</p> 	<p>Build upon knowledge of place value and use column multiplication</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>2</td> <td>4</td> </tr> <tr> <td>x</td> <td></td> <td></td> <td>3</td> </tr> <tr> <td></td> <td></td> <td>1</td> <td>2</td> </tr> <tr> <td></td> <td></td> <td>6</td> <td>0</td> </tr> <tr> <td></td> <td></td> <td>7</td> <td>2</td> </tr> </tbody> </table> <p style="text-align: right;">(4 x 3) (20 x 3)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td>3</td> <td>4</td> </tr> <tr> <td>x</td> <td></td> <td>2</td> </tr> <tr> <td></td> <td></td> <td>8</td> </tr> <tr> <td></td> <td>6</td> <td>0</td> </tr> <tr> <td></td> <td>6</td> <td>8</td> </tr> </tbody> </table>		H	T	O			2	4	x			3			1	2			6	0			7	2		T	O		3	4	x		2			8		6	0		6	8
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Multiply a 3-digit number by a 1-digit number

Set out 3-digit multiplication using Place Value counters and a Place Value chart.

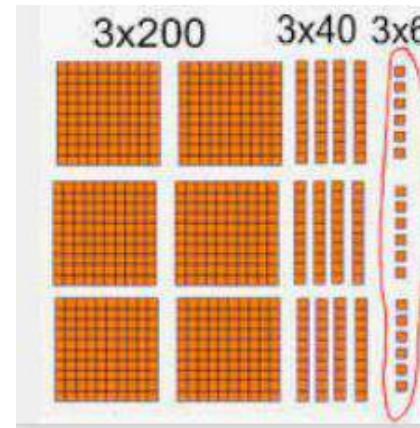
$$213 \times 3 =$$

Hundreds	Tens	Ones
 		  
 		  
 		  

Start without an exchange and then introduce an exchange.

Use Base 10 or Place Value counters to expand the numbers into HTO.

$$246 \times 3 =$$



Build on learning by modelling how to set out as column multiplication.

$$\begin{array}{r} 213 \\ \times 3 \\ \hline 639 \\ \hline \end{array}$$

$213 \times 3 = 639$

	4	8	7
x			9
<hr/>			
4	3	9	3
<hr/>			
	7	8	
























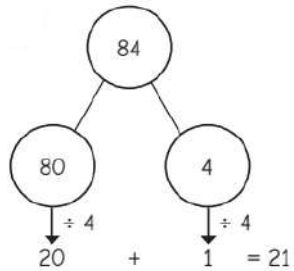
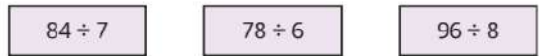








Key Vocabulary: repeated addition, groups of, lots of, times, multiplied by, array, times tables, multiplication and division facts, commutative, inverse, product, part whole, column multiplication, partitioning

Key skills for multiplication at Stage 4:

- Count in multiples of 6, 7, 9, 25 and 1000.
- Recall multiplication facts for **all multiplication tables up to 12 x 12.**
- Recognise place value of digits in up to 4-digit numbers.
- Use place value, known facts and derived facts to multiply mentally e.g. multiply by 0, 1, 10, 100, or to multiply 3 numbers.
- Use commutativity and other strategies mentally $3 \times 6 = 6 \times 3$, $2 \times 6 \times 5 = 10 \times 6$, $39 \times 7 = 30 \times 7 + 9 \times 7$.
- Solve problems with increasingly complex multiplication in a range of contexts.

Division

Stage 4 – Divide up to 3-digit numbers by a single digit, continuing to develop short division

Objective & Strategy	Concrete	Pictorial	Abstract										
Factor pairs	<p>Use counters and cubes to make arrays</p> <p>Complete the factor pairs of 12 and the sentences.</p> <p> $1 \times \underline{\quad} = 12$</p> <p> $\underline{\quad} \times 6 = 12$</p> <p> $\underline{\quad} \times \underline{\quad} = 12$</p> <p>12 has $\underline{\quad}$ factor pairs. 12 has $\underline{\quad}$ factors altogether.</p>	<p>Use factor bugs</p> <p></p> <p>Complete the factor bug for 20</p> <p></p>	<p>Link to solving problems by applying knowledge.</p> <p>Use counters to create arrays and find the factor pairs for each number.</p> <p></p> <p>Which of these numbers are factors of 20? 2 3 5 8 10 15</p>										
Divide a 2-digit number by a 1-digit number	<p>Use counters or Base 10</p> <p></p> <p>Use a Place Value chart to divide into equal groups</p> <p>$84 \div 4 =$</p> <table border="1" data-bbox="504 1173 772 1356"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	Tens	Ones									<p>Use a part-whole model to partition to divide</p> <p></p>	<p>$46 \div 2 = \underline{\quad}$ tens $\div 2$ and $\underline{\quad}$ ones $\div 2$ $= \underline{\quad}$ tens and $\underline{\quad}$ ones $= \underline{\quad}$</p> <p></p> <p>Short division can also be taught as an efficient method.</p>
Tens	Ones												
													
													
													
													

Divide a 3-digit number by a 1-digit number

Use Place Value counters or Base 10 and a Place Value chart to divide 3 digits by sharing into equal groups.

$$639 \div 3 =$$

Hundreds	Tens	Ones
100 100	10	1 1 1
100 100	10	1 1 1
100 100	10	1 1 1

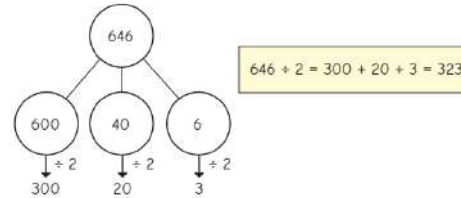
Then move onto when an exchange occurs.

Rosie uses place value counters to work out $435 \div 3$

Hundreds	Tens	Ones
100	30 30	1 1 1 1 1 1
100	30 30	1 1 1 1 1 1
100	30 30	1 1 1 1 1 1
100	30 30	1 1 1 1 1 1

Use part-whole models and recap partitioning into HTO.

$$646 \div 2 =$$

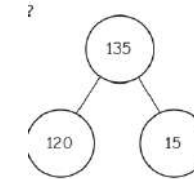


$$528 \div 2$$

$$672 \div 6$$

$$934 \div 4$$

$$135 \div 3 =$$



Short division can also be taught as an efficient method.

$$7 \overline{) 196}$$

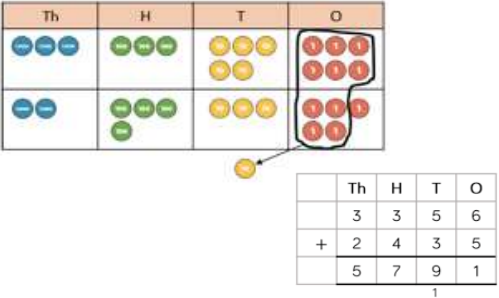
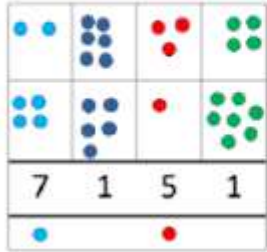
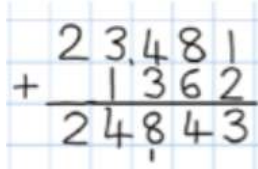
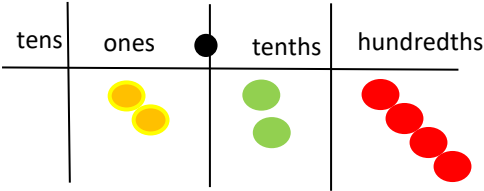
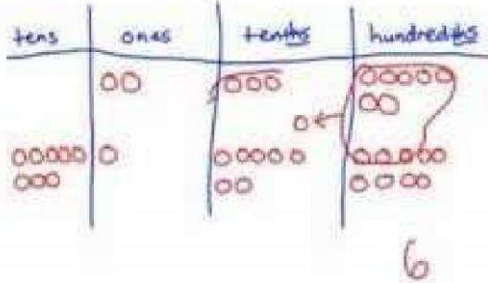
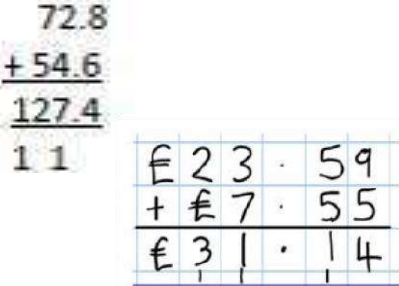
Key Vocabulary: grouping, how many groups? Divided by, equal groups, sharing, array, divide, division, bar model, number line, part-whole inverse, commutative, short division, exchange, remainders

Key skills for Division at Stage 4:

- Recall multiplication and division facts for all numbers up to 12×12 .
- Use place value, known and derived facts to multiply and divide mentally, including: multiplying and dividing by 10, 100 and 1.
- Pupils practise to become fluent in the formal written method for short division with exact answers when dividing by a 1-digit number.
- Pupils practise mental methods and extend this to 3-digit numbers to derive facts, for example $200 \times 3 = 600$ so $600 \div 3 = 200$.
- Pupils solve 2-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

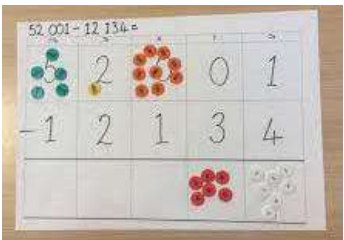
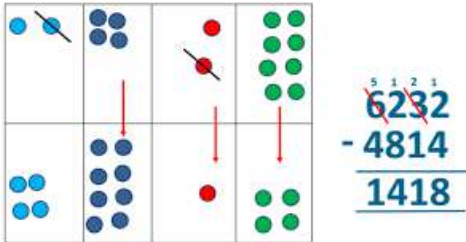
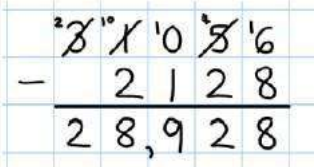
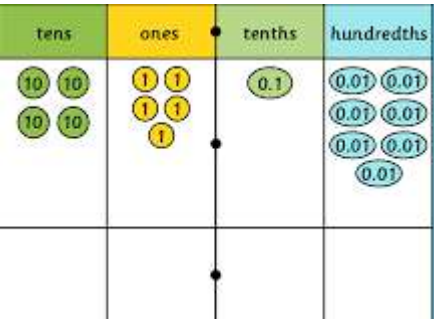
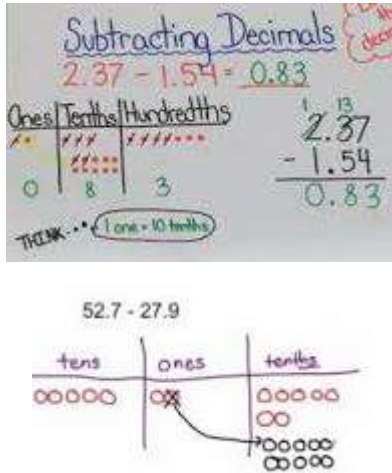
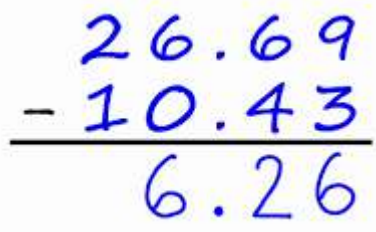
Stage 5 - Add numbers with 4 or more digits

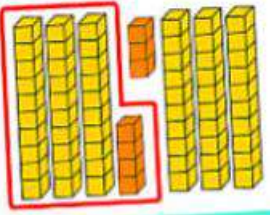
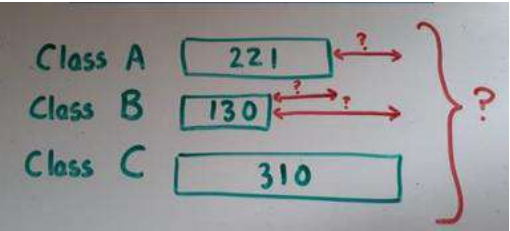
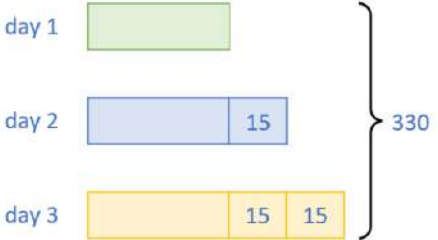
Addition

Objective & Strategy	Concrete	Pictorial	Abstract
Add numbers with 4 or more digits.	<p>Recap the formal written method using place value counters to reinforce exchanging.</p> 	<p>Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.</p> 	
Add decimals with 2 decimal places, including money.	<p>tens ones tenths hundredths</p>  <p>Introduce decimal place value counters and model exchange for addition.</p>	<p>2.37 + 81.79</p> 	<p>72.8 + 54.6 <u>127.4</u> 11</p> 
<p>Key Vocabulary: add, total, sum, altogether, combine, plus, increase, more, equals, number line, place value counters, hundred-thousands, ten-thousands, thousands, hundreds, tens, ones, partition, column, inverse, decimal point, tenths, hundredths</p> <p>Key skills for addition at Stage 5:</p> <ul style="list-style-type: none"> • Add numbers mentally with increasingly large numbers, using and practising a range of mental strategies i.e. add the nearest multiple of 10, 100, 1000 and adjust, inverse, partitioning and re-combining; using number bonds • Use rounding to check answers and accuracy • Solve multi-step problems in contexts, deciding which operations and methods to use and why • Read, write, order and compare numbers to at least 1 million and determine the value of each digit • Round any number up to 1, 000, 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • Add numbers with more than 4 digits using formal written method of column addition 			

Stage 5 - Subtract with at least 4 digit numbers

Subtraction

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Subtract with at least 4 digits</p>	<p>Children to use place value counters to physically remove and exchange quantities.</p> 	<p>Children to draw place value counters and show their exchange</p> 	
<p>Subtract with at least 4 digits, including money and measures. Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal</p>	<p>Children to use place value counters to solve subtraction. $45.17 - 23.14 = 22.03$</p> 	<p>Children to draw place value counters and show their subtracting and exchanging</p> 	<p>Remember to follow the decimal point into the answer</p> 

<p>Finding the difference</p>	<p>Find the difference between 67 and 33.</p> 	<p>Use comparison continuous models to find the difference, find the whole with numbers ≥ 3 digits. Also compare more than 2 groups</p>  <p>Write statements to explain your understanding of this model: The difference between Class C and Class A is 89; The difference between Class A and Class B is 91; the difference between Class C and Class B is 180; The total pupils in all classes is 661.</p>	<p>Application of subtraction and its inverse operation (addition)</p> <p>A baker makes gingerbread cookies over three days. Each day he makes 15 more cookies than the previous day. In total he bakes 330 cookies over the three days. How many cookies does he bake on day 2?</p> 
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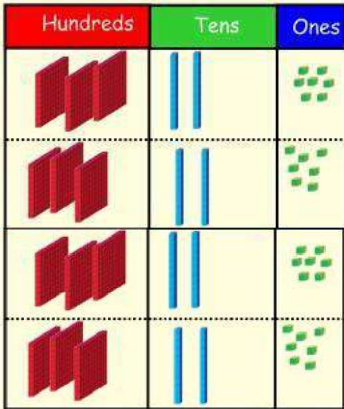
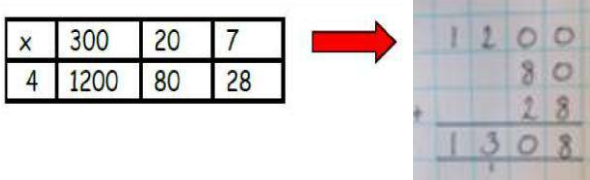
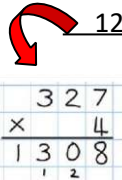
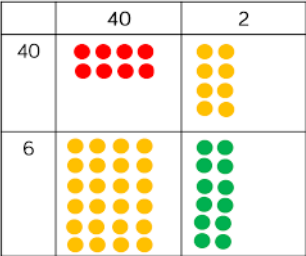
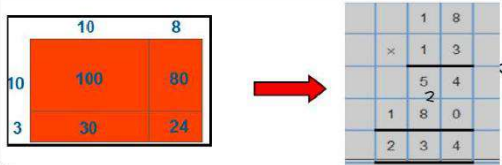
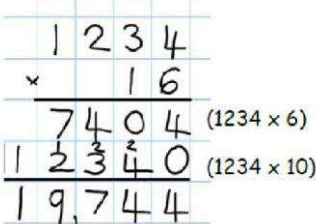
Key Vocabulary: subtract, less than, fewer than, more than, minus, difference, comparison, partitioning, reduction, take away, how many left? Decrease, remove, number line, partition, place value counters, hundred-thousands, ten-thousands, thousands, hundreds, tens, ones, exchange, column, inverse, decimal point, tenths, hundredths

Key skills for addition at Stage 5:

- Subtract numbers mentally with increasingly large numbers
- Use rounding and estimation to check answers to calculations and determine, in a range of contexts, levels of accuracy
- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1 million
- Interpret negative numbers in context, counting forwards and backwards with positive and negative integers through 0

Stage 5 – Multiply up to 4 digits by a 1 or 2-digit number

Multiplication

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Column Multiplication for 3 and 4 digits x 1 digit.</p>	 <p>It is important at this stage that they always multiply the ones first. Children can continue to be supported by place value counters at the stage of multiplication. $327 \times 4 = 1308$</p>	<p>Make comparisons between the grid method and the short column multiplication method to see how the steps are related.</p> 	<p>Abstract</p> $\begin{array}{r} 327 \\ \times 4 \\ \hline 28 + \\ 80 \\ \hline 1308 \end{array}$  <p>This will lead to the compact formal written method of short multiplication</p>
<p>Column multiplication</p>	<p>Manipulatives may still be used with the corresponding long multiplication modelled alongside.</p> 	<p>Make comparisons between the grid method and the long column multiplication method to see how the steps are related.</p> 	

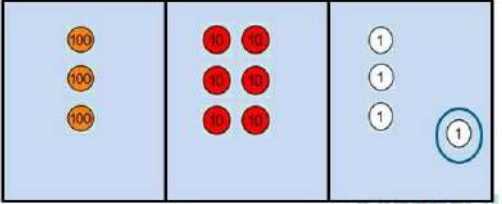
Key Vocabulary: repeated addition, groups of, lots of, times, multiplied by, array, times tables, multiplication and division facts, commutative, inverse, division, divide, partition, grid method, total, multiple, product, factor, integer, formal written method (short and long)

Key skills for addition at Stage 5:

- Identify multiples and factors, using knowledge of multiplication tables to 12 x 12
- Solve problems where larger numbers are decomposed into their factors
- Multiply and divide integers and decimals by 10, 100 and 1000
- Recognise and use square and cube numbers and their notation
- Solve problems involving combinations of operations, choosing and using calculation and methods appropriately

Division

Stage 5 – Divide up to 4 digits by a single digit including those with remainders

Objective & Strategy	Concrete	Pictorial	Abstract
Formal Written Method (short division)	$364 \div 3 =$ $\begin{array}{r} 121 \text{ rem } 1 \\ 3 \overline{) 364} \end{array}$ 		<p>Once children understand remainders, begin to express as a fraction.</p> $\begin{array}{r} 86 \text{ r } 2 \\ 3 \overline{) 432} \\ 5 \overline{) 186} \text{ } \frac{1}{5} \end{array}$


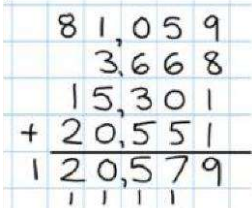

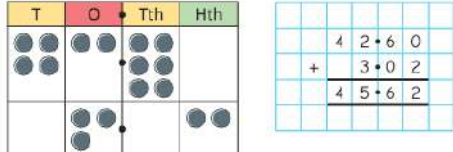
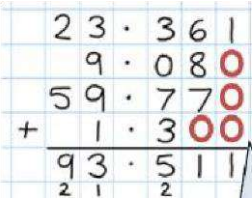
Key Vocabulary: sharing, grouping, divide, divided by, division, remainder, inverse, formal written methods (short division), multiple, factor, prime number, prime factor, composite number (non-prime)

Key skills for addition at Stage 5:

- Recall multiplication and division facts for all numbers up to 12 x 12 (as in stage 4).
- Multiply and divide numbers mentally, drawing upon known facts.
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
- Solve problems involving multiplication and division where larger numbers are decomposed into their factors.
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
- Use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
- Work out whether a number up to 100 is prime, and recall prime numbers to 19.
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.
- Use multiplication and division as inverse.

Addition

Stage 6 - Add several numbers of increasing complexity.

Objective & Strategy	Concrete	Pictorial	Abstract
Formal Written method with whole numbers.	If required use base 10 equipment or place value counters. 		
Formal Written method with decimals numbers.		The image supports the written calculation in the book. Children can physically count and add the place value counters. 	

Key Vocabulary: add, total, sum, altogether, combine, plus, increase, more, equals, number line, place value counters, hundred-thousands, ten-thousands, thousands, hundreds, tens, ones, partition, column, inverse, decimal point, tenths, hundredths, thousandths


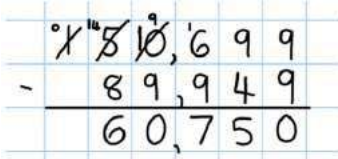

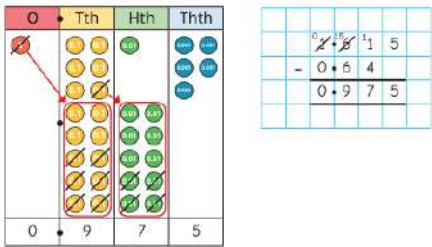
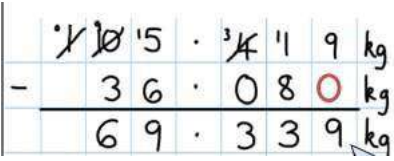
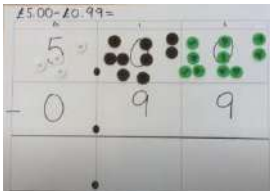

Key skills for addition at Stage 6:

- Perform mental calculation, including with mixed operations and large numbers, using and practising a range of mental strategies.
- Solve multi-step problems in context, deciding which operations and methods to use and why.
- Use estimation to check answers to calculation and determine, in the context of a problem, levels of accuracy.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit.
- Round any whole number to a required degree of accuracy.

**Pupils understand how to add mentally with larger numbers and calculations of increasing complexity.

Stage 6 – Subtracting with increasingly large and more complex numbers including decimals

Subtraction

Objective & Strategy	Concrete	Pictorial	Abstract
Formal Written method with whole numbers.	If required use base 10 equipment or place value counters. 		Children must remember to use one-digit per square. 
Formal Written method with decimals numbers.		The image supports the written calculation in the book. Children can physically cross out place value counters. 	Remember to follow the decimal point into the answer. 
Formal Written method using whole numbers and decimal numbers.	Children to understand how the value of a numeral is equal to a value in previous place value column. Place value counters will help show the transition from a One to ten tenths. 		Remind children to keep all number formation clear to ensure no errors occur in exchanging. 

Key Vocabulary: subtract, less than, fewer than, more than, minus, difference, comparison, partitioning, reduction, take away, how many left? Decrease, remove, number line, partition, place value counters, hundred-thousands, ten-thousands, thousands, hundreds, tens, ones, exchange, column, inverse, decimal point, tenths, hundredths, thousandths

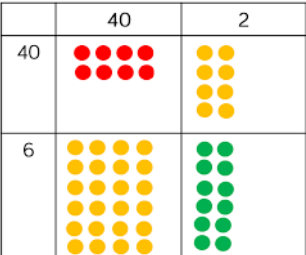
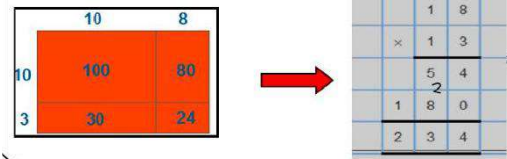
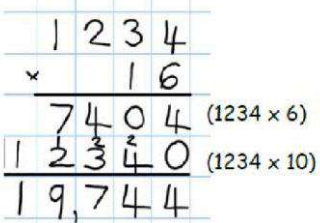
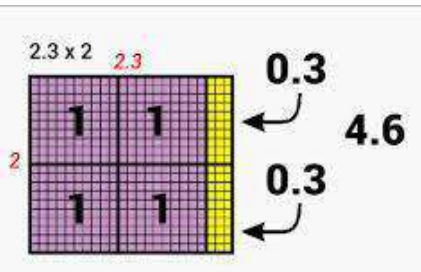

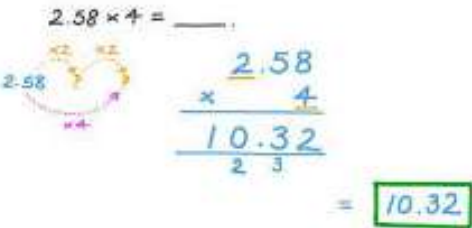
Key skills for addition at Stage 5:

- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why
- Read, write, order and compare numbers up to 10 million and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context, and calculate intervals across zero

**Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate.

Stage 6 – Multiply up to 4 digits by a 2-digit number and multiply decimals by a single digit.

Multiplication

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Column multiplication</p>	<p>Manipulatives may still be used with the corresponding long multiplication modelled alongside.</p> 	<p>Make comparisons between the grid method and the long column multiplication method to see how the steps are related.</p> 	
<p>Column multiplication with decimals</p>		<p>$1.212 \times 3 = 3.636$</p> 	
<p>Key Vocabulary: repeated addition, groups of, lots of, times, multiplied by, array, times tables, multiplication and division facts, commutative, inverse, division, divide, partition, grid method, total, multiple, product, factor, integer, formal written method (short and long), tenths, hundredths, thousandths</p> <p>Key skills for addition at Stage 6:</p> <ul style="list-style-type: none"> Recall multiplication facts for all times tables up to 12 x 12 (as year 5 and year 5) Multiply multi-digit numbers, up to 4-digit x 2-digit using long multiplication Perform mental calculations with mixed operations and large numbers Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods Multiply decimal numbers by a 1-digit number using the formal written method <p>*Estimate answers using round and approximation and determine</p>			

Division

Stage 6 – Divide up to 4 digits by a 2-digit number and divide decimals by a single digit including with remainders

Objective & Strategy	Concrete	Pictorial	Abstract
Formal Written Method (short division with decimals)			$142 \div 4 = 35 \cdot 5$ $\begin{array}{r} 035 \cdot 5 \\ 4 \overline{)142 \cdot 0} \end{array}$ <p style="text-align: right; margin-right: 20px;"><small>r2 2/4 = 1/2 = 0.5</small></p> $\begin{array}{r} 15 \cdot 8 \\ 5 \overline{)79 \cdot 0} \end{array}$
Formal Written Method (long division)			<p>Remind children to begin by forming the multiples of the divisor using mental methods e.g. partitioning, round and adjust</p> <p>how many per store? → 3,524 R 6</p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p>24 48 72 96 120 144 168 192 216 240</p> </div> <div style="margin-right: 20px;"> $\begin{array}{r} 24 \overline{)85,582} \\ \underline{72} \\ 125 \\ \underline{120} \\ 58 \\ \underline{48} \\ 102 \\ \underline{96} \\ 6 \end{array}$ </div> <div style="border: 1px solid black; padding: 5px;"> $\begin{array}{r} 22 \\ 24 \overline{)528} \\ \underline{-48} \\ 48 \\ \underline{-48} \\ 0 \end{array}$ </div> </div>

Key Vocabulary: sharing, grouping, divide, divided by, division, remainder, inverse, formal written methods (short division), multiple, factor, prime number, prime factor, composite number (non-prime)

Key skills for addition at Stage 6:

- Recall multiplication and division facts for all numbers up to 12×12 (as in stage 4).
- Multiply and divide numbers mentally, drawing upon known facts.
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
- Solve problems involving multiplication and division where larger numbers are decomposed into their factors.
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
- Use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
- Work out whether a number up to 100 is prime, and recall prime numbers to 19.
- Divide numbers involving decimals by a one-digit number using the formal method of short division.
- Divide numbers up to 4 digits by a two-digit number using the formal written method of long division and interpret remainders appropriately for the context.
- Use multiplication and division as inverse.