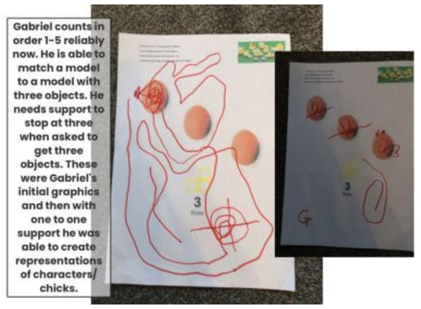
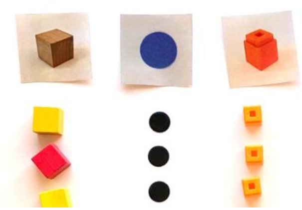
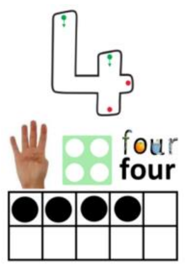
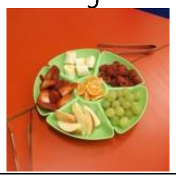
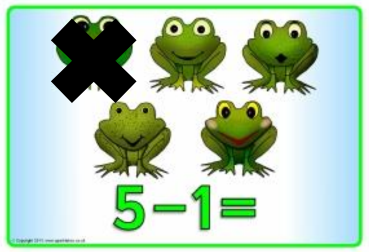
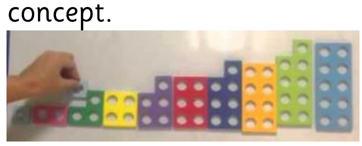
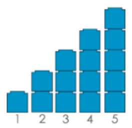
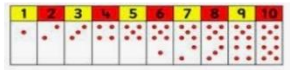
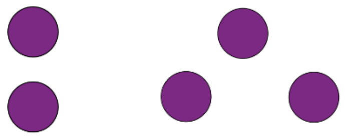
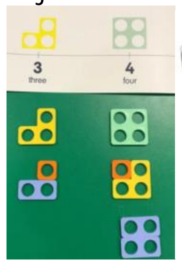
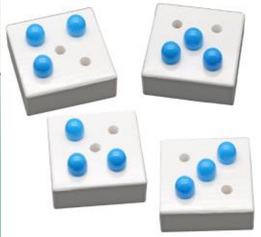
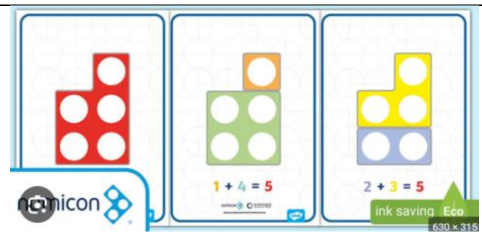
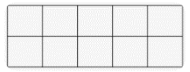
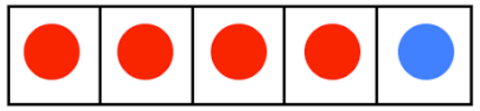
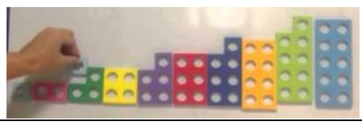
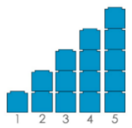
Y Nursery - Addition	Concrete	Pictorial	Abstract
Children in the EYFS are working towards the Early Learning Goals as stated below. In the curriculum we have created for our school children in nursery learn the pre-requisite knowledge in order to lay the foundations for future learning- • To count out up to five objects from a larger set reliably. • To recognise sets of 1, 2 and 3 objects. • To compare two groups saying when one has more or the same. • To say the number names 1-5 in order forwards and backwards. • To know a number can represent a quantity and the number changes when an object is added or removed. • To know the number that comes after and before 1-3.	**<u>Counting, ordinality and adding more</u>** Children learning to orally count in a variety of ways such as through songs, rhymes, routines, chanting etc.   They count objects through touch. They are taught ways to do this explicitly and systematically such as lining up/ moving objects.  Children in nursery understand the concept of more in relation to sets. They know that more means a greater number of objects. They compare two sets of physical objects, knowing when one has more objects. Children are shown and attempt to recreate staircase arrangements. They count out sets to match numerals along a number track, with support.   They count out sets of objects onto number tracks to support their understanding of ordinality. 	**<u>Counting, ordinality and adding more</u>** Children begin to count actions and sounds. They begin to compare two images which represent sets through the use of rhymes and stories.  Children see number tracks in many contexts. They are asked to match a numeral to numeral in order to sequence.  They begin to record quantities through graphics, initially on images and then later without.  	**<u>Counting, ordinality and adding more</u>** Children begin to use the language of more.
	<u>Subitising</u> Perceptual - Children are taught to notice. They are given opportunities to see sets in a variety of ways in order to support them to subitise sets of up to three.	**<u>Subitising</u>** Children match objects to images to develop their understanding that quantities can be represented pictorially.	**<u>Subitising</u>** Children begin to know and recall number bonds to three.

	Conceptual – Children begin to see sets within numbers. “I can see one and one so there is two.” Children know that if objects are moved, the set is still the same quantity. They know that if an object is added the quantity changes. Children count out repeated sets of different objects in order to recognise how a quantity looks. 	Children use graphics to record quantities initially with an image of a model to support and later without.  Children see numbers represented in a range of formal ways such as lines, Hungarian dice, five frames and numicon.  They also see random representations.	
	Part-part-whole model Children explore whole sets in a variety of ways; They understand that a whole is a quantity. That the last number said is the total (cardinality). They explore breaking up wholes into parts during practical activity and routines such as sharing out an amount of fruit. 	**Part-part-whole model** Children see images of whole sets. The adult may use graphics to represent the physical objects.	**Part-part-whole model** Children talk about sets and the number of objects.
	Composition of numbers 0 – 3 Children recognise that numbers can represent how many objects there are in a set; for small sets we can recognise the number of objects (subitise) instead of counting them. (As above.) Children explore making numbers in a variety of ways, using two different types of objects. As above they use numicon to create these too. (Numicon jigsaws.)	**Composition of numbers 0 – 3** Children begin to use pictorial representations to understand composition of numbers and can show them through graphics. Adults model this regularly.	**Composition of numbers 0 – 3** Children use everyday language to talk about the composition of numbers.

	 Children discuss what is the same and what is different in their comparisons. Number rhymes are used to illustrate this – 2 ducks are in the pond and one duck is not. There are 3 altogether.  		
Year N - Subtraction	Concrete	Pictorial	Abstract
• To compare two groups saying when one has more, fewer or the same. • To say the number names 1-5 in order forwards and backwards. • To know a number can represent a quantity and the number changes when an object is added or removed. • To know the number that comes after and before 1-3.	**<u>Counting back and taking away from a whole</u>** Children learning to orally count in a variety of ways such as through songs, rhymes, routines, chanting etc. They learn to count backwards. They learn that when counting backwards the quantity gets smaller. Children in nursery understand the concept of one less in relation to sets. They understand that this means the removal of one object. They know if an object is removed the total in the set changes. They know that when there is one less there is a smaller/ fewer number of objects. They know that fewer objects relates to the set being smaller. They compare two sets of physical objects, beginning to recognise when one has fewer objects within it. Children are shown and attempt to recreate staircase arrangements. They count out sets to match numerals along a number track, with support. They count backwards along these.	**<u>Counting back and taking away from a whole</u>** They begin to compare two images which represent sets through the use of rhymes and stories, recognising when one has less or fewer objects.  Children see number tracks in many contexts. They are asked to match a numeral to numeral in order to sequence. They begin to record quantities through graphics, initially on images and then later without. They begin to cross out images to show there is one less, for example, when recording what is happening in a number rhyme.  	**<u>Counting back and taking away from a whole</u>** Children begin to use the language of less and fewer.

	They count out sets of objects onto number tracks to support their understanding of ordinality. 		
Year R – Addition			
Number ELG Children at the expected level of development will: • Have a deep understanding of number to 10, including the composition of each number; • Subitise (recognise quantities without counting) up to 5; • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. Numerical Patterns ELG • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;	**<u>Counting, ordinality and adding more</u>** Children use objects and or people to learn to count. When they know the number order well, they progress to counting on. They know what the next number will be. Children relate counting to an order. They know that numbers have an order which is important. They begin to relate the order to the amount. For example, they know that 4 is a larger quantity than three because it comes after. Staircase arrangements are used to support this concept.   They understand what one more is through the use of real objects. Number rhymes are also used to teach this. Children start with 1 more and progress to a few more.	**<u>Counting, ordinality and adding more</u>** Children look at and recreate sequences using number tracks.   They use graphics to draw one more and recount the set. They use graphics to draw one more and know it is the number that comes after.	**<u>Counting, ordinality and adding more</u>** Children begin to use the language of more/ after. They can use a number track to point to the number that comes after/ is one more than a number.
	<u>Subitising</u> Perceptual - Children build on their ability to notice. They continue to be given opportunities to see sets in a variety of ways in order to support them to subitise sets of up to five. Conceptual – Children can see sets within numbers. “I can see two and three so there is five.”	**<u>Subitising</u>** Children record sets within sets by drawing around amounts.  They place images together to represent numbers. Such as numicon images.	**<u>Subitising</u>** Children recall number bonds to 5.

	 Children know that if objects are moved, the set is still the same quantity. They know that if an object is added the quantity changes.  	 Children recognise sets of up to five instantly in a variety of standardised and random arrangements.    	
	<u>Part-part-whole model</u> Children learn to recognise what a set is. They know that a set of objects can be broken up into parts. This is explored in a range of contexts. They begin to understand the parts might look different; each part will be smaller than the whole, and the parts can be combined to make the whole.  	**<u>Part-part-whole model</u>** Children start to represent the model using graphics.	**<u>Part-part-whole model</u>** Adults model writing calculations/ equations to represent what the model is showing.
	<u>Composition of numbers 0 – 5</u> Children recognise that numbers can represent how many objects there are in a set; for small sets we can recognise the number of objects (subitise) instead of counting them. (As above.) Children explore making numbers in a variety of ways, using two different types of objects. As above they use numicon to create these too. (Numicon jigsaws.)  4+1=5 Children discuss what is the same and what is different in their comparisons.	**<u>Composition of numbers 0 – 5</u>** Children use pictorial representations to understand composition of numbers and can show them using graphics an some numerals.	**<u>Composition of numbers 0 – 5</u>** Adults model the concept of commutativity. Children recall number facts.

	Number rhymes are used to illustrate this – 3 monkeys are on the bed and two monkeys are off. There are 5 altogether. 		
	<u>Composition of numbers 5 – 10</u> Children build on from their composition of numbers to 5, to explore numbers to 10 using concrete apparatus. They start to see at numbers can represent how many objects there are in a set; they continue to build their recognition of number of object (subitise) instead of counting them.	**<u>Composition of numbers 5 – 10</u>** Children use pictorial representations to understand composition of numbers and can show them using numicon, fingers and a ten frame. 	**<u>Composition of numbers 5 – 10</u>** Children recall how some numbers are made of other numbers.
	<u>Number bonds to 5</u> Similarly to composition of numbers, children focus on how 5 is created. They use real objects to pull five apart into two groups and put it together again. A variety of objects and scenarios are used.	**<u>Number bonds to 5</u>** Children use pictorial representations to show number bonds to five including using graphics in 5 frames, Hungarian dice images and no image.  Adults model how to write calculations/ equations.	**<u>Number bonds to 5</u>** Children recall number bonds to 5.
Year R- Subtraction	Concrete	Pictorial	Abstract
Number ELG Children at the expected level of development will: • Have a deep understanding of number to 10, including the composition of each number; • Subitise (recognise quantities without counting) up to 5; • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction	**<u>Counting back and taking away from a whole</u>** Children use objects and or people to learn to count. Children relate counting to an order. They know that numbers have an order which is important (ordinality and cardinality.) They begin to relate the order to the amount. They know that they can count forwards and backwards. For example, they know that 4 is a smaller quantity than 5 because it comes before. Staircase arrangements are used to support this concept. Children are shown how to move backwards – from right to left.  	**<u>Counting back and taking away from a whole</u>** Children explore recording subtractions pictorially by crossing out images. They use number tracks to move a counter backwards. Adults model writing equations/ calculations and children begin to imitate this.	**<u>Counting back and taking away from a whole</u>** Children use language of subtraction in relation to the mathematical problems they encounter. Children recall subtraction facts.

<table>
<tr>
<td rowspan="2">facts) and some number bonds to 10, including double facts.
Numerical Patterns ELG
• Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;</td>
<td>They understand what one less is through the use of real objects and physically removing objects. Number rhymes are also used to teach this.

Children start with 1 less and progress to removing more from a set using real objects. A range of scenarios are used including using number rhymes and acting out stories such as being on the bus.

They know that removing an object from a set makes the quantity smaller.</td>
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<tr>
<td><u>Using number facts to subtract</u>
Children begin to relate their knowledge of the composition of numbers to subtraction.

Adults articulate - We know that 5 is made of 4 and 1 so five subtract one must be four.

They use a range of practical objects and scenarios in order to do this – objects, numicon, fingers.</td>
<td><u>Using number facts to subtract</u>
As above.</td>
<td><u>Using number facts to subtract</u>
Children begin to articulate stem sentences regarding subtraction.</td>
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<tr>
<td>Year 1 – Addition</td>
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<tr>
<td>National Curriculum objectives</td>
<td>Concrete</td>
<td>Pictorial</td>
<td>Abstract</td>
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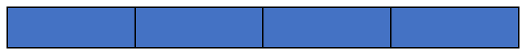
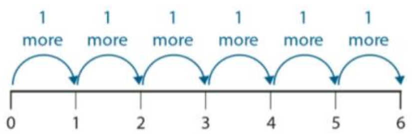
<tr>
<td>read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
represent and use number bonds and related subtraction facts within 20
add and subtract one-digit and two-digit numbers</td>
<td><u>Counting on and adding more</u>
Children use concrete apparatus to count on and add more. Children create understanding to always start with the biggest number first. They understand that their new number will always be greater than the one they started with as they are adding more.



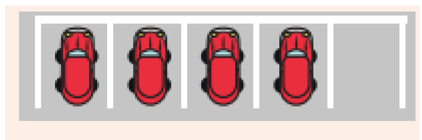
One more than 4 is 5.


Children may make visual comparisons.</td>
<td><u>Counting on and adding more</u>
Children use pictorial representations to count on and add one more. Ensuring they understand to start with the biggest number first.

One more than 3 is 4.

Once secure they will look at using pictorial representations to add more than one. They may use number lines to secure their counting, ensuring they place their finger on the point of the number line.

</td>
<td><u>Counting on and adding more</u>
Children will solve problems involving counting on and adding more.

They create first, now, then stories linked to counting on.


First there were 4 cars


Then one more came.

Now, there are 5 cars.</td>
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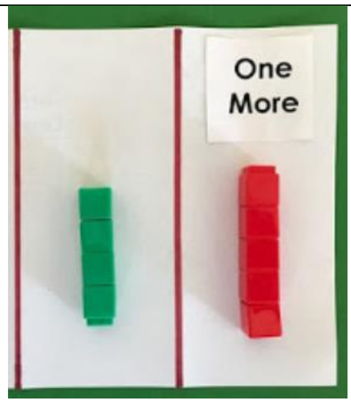
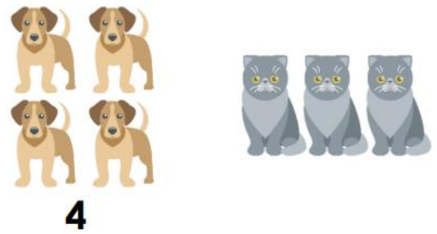
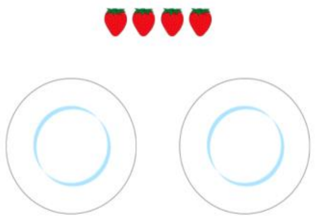
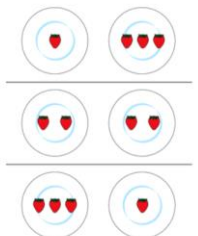
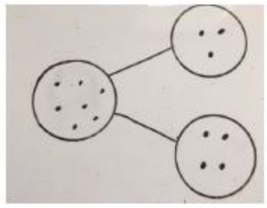
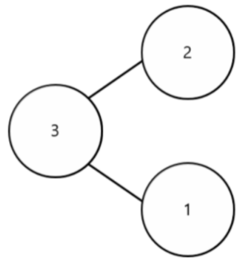
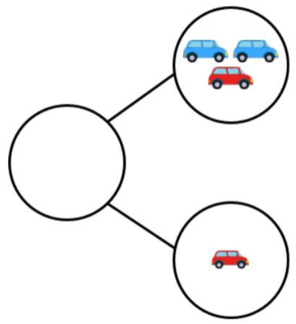
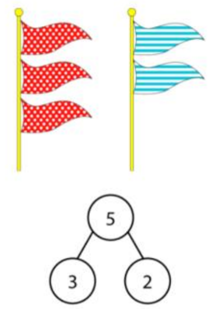
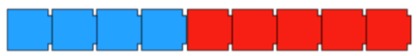
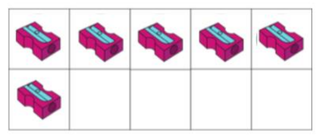
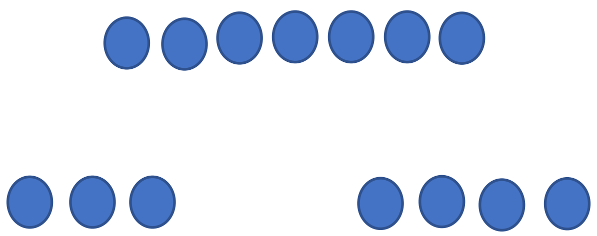
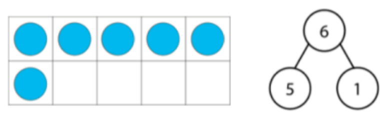
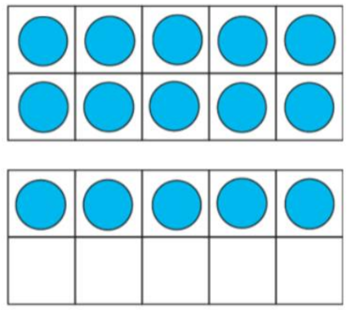
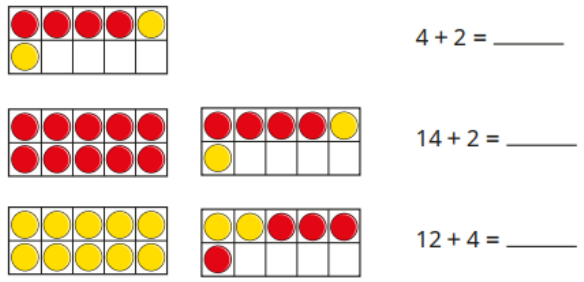
to 20, including zero • solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9.		 3 more than 4 is seven. There are 7 pets in total. Ensure children are counting on rather than counting all again.	
	<u>Part-part-whole model</u> Children understand that a 'whole' can be represented by one object; if some of the whole object is missing, it is not the 'whole'. They use concrete apparatus such as multilink or objects to split a whole, exploring the various possibilities.  They understand the parts might look different; each part will be smaller than the whole, and the parts can be combined to make the whole.  Have you found all the possibilities – how do you know? What is the same with the part whole models you have created? What is different?	**<u>Part-part-whole model</u>** Children use pictorial representations and create drawings to represent their whole broken down into parts. They explore the various possibilities.  Children may wish to use mark making when representing their part whole models. The parts are 4 and 3. The whole is 7. The parts are 2 and 5. The whole is 7. The parts are 1 and 6. The whole is 7. How can you find all the possibilities? What is the same? What is different.	**<u>Part-part-whole model</u>** Children use a part-whole model to represent the numbers. They write calculations to explain their part-whole models.  1 + 2 = 3 They understand calculation can be written either way and the whole will remain the same. They start to see that addition is commutative, when the order of the addends is changes, the sum remains the same.  Ensuring they establish relationship between the parts and the whole, which will help them find missing numbers.
	<u>Composition of numbers 0 – 5</u> Children recognise that numbers can represent how many objects there are in a set; for small	**<u>Composition of numbers 0 – 5</u>**	**<u>Composition of numbers 0 – 5</u>**

	sets we can recognise the number of objects (subitise) instead of counting them.  Use counters or multilink to show compositions to 5. 2 + 3 = 5 4 + 1 = 5 Children discuss what is the same and what is different in their comparisons.	Children use pictorial representations to understand composition of numbers and can show them as a part-whole model, bar model or a five frame.  5 3 2	Once children start to understand the composition of number, they will start to understand commutativity that 2 + 3 = 5, they also know that 3 + 2 = 5 Children learn to use their knowledge to find missing numbers.
	Composition of numbers 5-10 Children build on from their composition of numbers to 5, to explore numbers to 10 using concrete apparatus. They start to see at numbers can represent how many objects there are in a set; they continue to build their recognition of number of object (subitise) instead of counting them.  4 + 5 = 9	**Composition of numbers 5-10** Children use pictorial representations to understand composition of numbers and can show them as a part-whole model, bar model or a ten frame.  6	**Composition of numbers 5-10** Once children start to understand the composition of number, they will start to understand commutativity that 7 + 2 = 9, they also know that 2 + 7 = 9 Children learn to use their knowledge to find missing numbers. Children will explore all possibilities for a given number up to 10. Ensuring that they include the calculation where one of the parts is zero.
	Number bonds within 10 Children use concrete resources such as multilink and counters. Starting with a number as a whole they break apart a group and put it back together to find and form all number bonds for a given number to ten. Working systematically to find all possibilities.  3 + 4 = 7	**Number bonds within 10** Children will use varies pictorial methods, such as ten frames to break apart a group and find number bonds.  Children will use models, such as part-whole or bar models to help them find missing numbers. 6 5	**Number bonds within 10** Children build on their understanding of composition of numbers. Children will ensure they explore all possibilities: - For example – number bonds to 5 = 0 + 5 = 5 1 + 4 = 5 2 + 3 = 5 They see that they are commutative, so 0 + 5 is same as 5 + 0 They will solve missing number calculations.

	<u>Number bonds within 20</u> Children will create number bonds up to 20 by using concrete apparatus such as counters or multilink, beads, rekenrek counting frames, starting with a whole and breaking it down into parts.  	**<u>Number bonds within 20</u>** Children will use pictorial representations such as part whole models and ten frames to become fluent in number bonds to 20. 	**<u>Number bonds within 20</u>** Children will ensure they explore all possibilities for number bonds within 20: - For example – number bonds to 12 = 0 + 12 = 12 1 + 11 = 12 2 + 10 = 12 3 + 9 = 12 4 + 8 = 12 5 + 7 = 12 6 + 6 = 12 Learning to work systematically to ensure they have found them all. They will understand that they are commutative, so 5 + 7 = 12 is the same as 7 + 5 They will solve missing number calculations.
	<u>Adding ones using number bond knowledge</u> Children explore using concrete apparatus how to add using their knowledge of number bonds and related facts. They will use apparatus such as counters, base ten and ten frames to see the links between related facts, noticing that, for example, 11 + 5 is 10 more than 1 + 5. Exploring through adding ten to their original calculation.  6 + 3 = 9 16 + 3 = 6 + 13 =	**<u>Adding ones using number bond knowledge</u>** Children will use pictorial representations to add using their knowledge of related facts. 	**<u>Adding ones using number bond knowledge</u>** Children will create STEM sentences about related facts. The use what they know about related facts to find missing numbers. 1 + ____ = 7 11 + ____ = 17

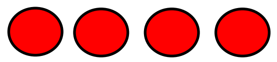
<table>
<tr><th colspan="4"><u>Year 1 – subtraction</u></th></tr>
<tr>
<td rowspan="3">

- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9.

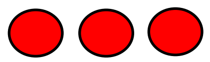
</td>
<td>

<u>Counting back and taking away from a whole</u>
Children use concrete objects, such as counters, multilink etc; to physically remove one or more to find out how many are left.

There were 4 in total



Now, there are 3



I know that 4 – 3 = 2

</td>
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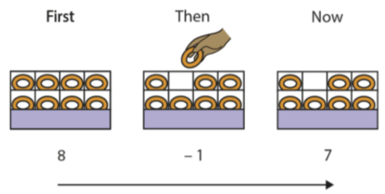
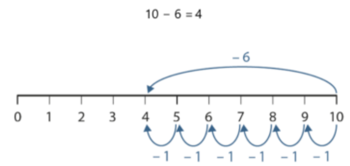
<u>Counting back and taking away from a whole</u>



Use pictorial resources, alongside contextual story to help children understand taking away. I start with 8 donuts; I take one away. How many do I have left? 8 – 1 = 7

</td>
<td>

<u>Counting back and taking away from a whole</u>



Children use a number line to count back. Place my fingers on starting number – 10, count back 6 places. What number are you on now?

Children find missing numbers using bar models and part-whole models to help them find missing parts.

7	
1	?

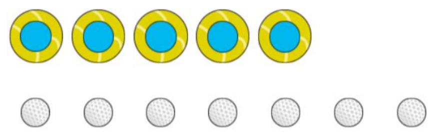
</td>
</tr>
<tr>
<td>

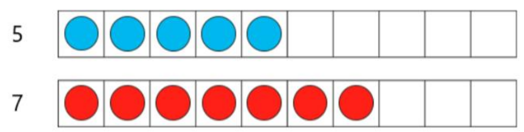
<u>Finding the difference</u>
Children make observations to compare two groups/ wholes to find the difference so they can make links between seeing and working out the difference.

6 is one more than 5.
5 is one less than 6.
The difference between 6 and 5 is one.

</td>
<td>

<u>Finding the difference</u>
Children use pictorial representations to find the difference.

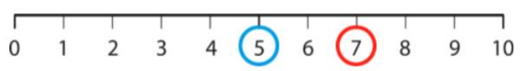




7 is two more than 5.
5 is two less than 7.
The difference between 7 and 5 is 2.

</td>
<td>

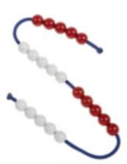
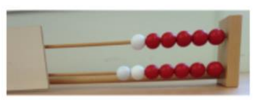
<u>Finding the difference</u>
Children use subtraction, on a number line to find the difference.



7 is two more than 5.
5 is two less than 7.
I can see the difference between 7 and 5 is 2.

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

<u>Subtracting within 20</u>

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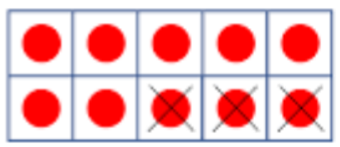
<td>

<u>Subtracting within 20</u>
Children use ten frames to help them subtract efficiently.



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<td>

<u>Subtracting within 20</u>
Children use their knowledge of number bonds within 10 to help them subtract efficiently.

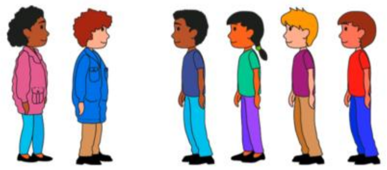
If using visual representations, they will be able to see that 12 – 5 =

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

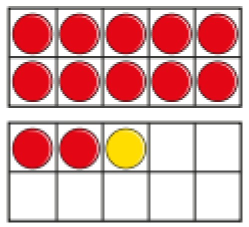
<table>
<tr>
<td></td>
<td>Children understand how to use subtract ones efficiently, they use their number bond knowledge to help them subtracting. Children subitise using beads and concrete apparatus to help them continue with embedding composition of the number.

5 – 3 = 2
15 – 3 = 12

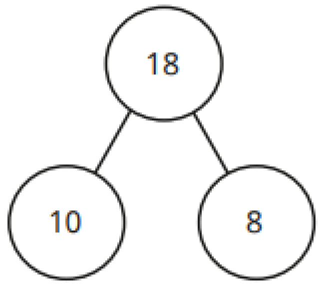
They learn to use their knowledge of subtracting 10s and their number bond knowledge to help them work more efficiently.

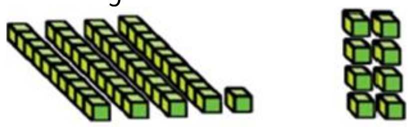
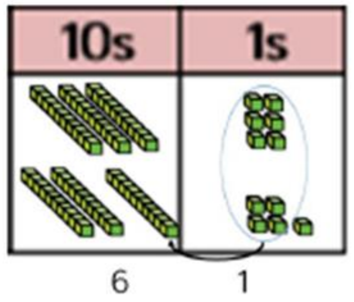
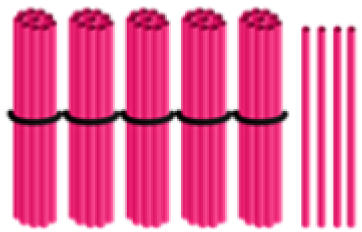
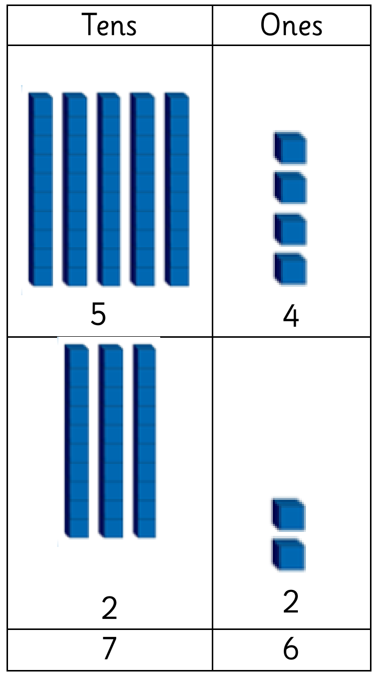


Using role play, 6 children play together at lunch, two decide they want to play a different game. how many are left?
6 – 2 = 4</td>
<td>

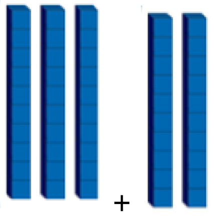
I have 12 to start with. I subtract 5, I can see I have 7 left.</td>
<td>5 = 2 + 3
12 – 2 = 10
10 – 3 = 7</td>
</tr>
<tr>
<td></td>
<td><u>Subtraction using related facts</u>
Use concrete apparatus to explore fact families for numbers within 20. Introduce children to addition and subtraction are inverse operations. Reinforce however that addition is commutative, whereas subtraction isn’t.

12 + 1 = ______
13 – 1 = ______</td>
<td><u>Subtraction using related facts</u>
Children use pictorial resources, such as bar models and part whole models to find fact families.
<table><tr><td colspan="2">16</td></tr><tr><td>6</td><td>10</td></tr></table>
10 + 6 = 16
6 + 10 = 16
16 – 6 = 10
16- 10 = 6</td>
<td><u>Subtraction using related facts</u>
Children use their knowledge of fact families to solve missing number problems.   They could use number lines or apparatus to help them find these.

8 - ____ = 2
18 - ____ = 12</td>
</tr>
</table>

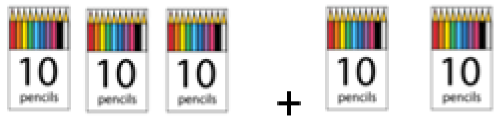
		 ______ + ______ = 18 ______ = ______ + ______ ______ + ______ = 18 ______ = ______ + ______ 18 – ______ = ______ ______ = ______ – ______ 18 – ______ = ______ ______ = ______ – ______	

Year 2 – Addition and subtraction			
National Curriculum objectives	Concrete	Pictorial	Abstract
• solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures • applying their increasing knowledge of mental and written methods • recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • add and subtract numbers using concrete objects, pictorial representations, and mentally, including: - a two-digit number and 1s - a two-digit number and 10s	**<u>Understanding place value to 100</u>** Group concrete apparatus into tens and ones. Show these on a place value grid. Continue to develop understanding of partitioning and place value e.g. 41 + 8  Explore with concrete apparatus what happens when there is more than 9 in a place value column?  When there are 10 ones in the 1s column we exchange for 1 ten. Use place value counters/ dienes etc, as appropriate, to support, especially when having to carry over.	**<u>Understanding place value to 100</u>** Use visual representations such as ten frames, place value boards and grouping pictures into tens and ones.  Represent onto a place value grid. Show when there are 10 ones in the 1s column we exchange for 1 ten.  Use place value chart and pictorial representations to show adding up to 2 digits together.	**<u>Understanding place value to 100</u>** Solve problems with addition including number calculations. 54 + 4 = ? = 54 + 4 I have 34 cakes; I am given 5 more. How many do I now have? Use STEM sentences to explain reasoning,

<table>
<tr>
<td rowspan="2">
- 2 two-digit numbers
• adding 3 one-digit numbers show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot
• recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
</td>
<td>
<u>Use known number facts – number bonds – adding in tens and ones</u>
Use concrete apparatus to help with using known facts when adding. Discuss unitising to add 10s.

I know that 3 + 2 = 5.

So, I know that 3 tens add 2 tens is 5 tens.

They explore using concrete apparatus adding 1s.

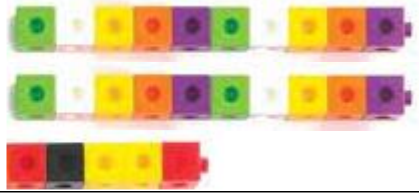
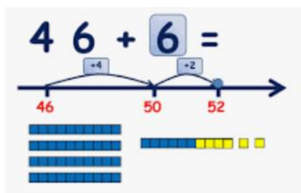
23 is 2 tens and 3 one.
23 add 4 ones is 2 tens and 7 ones.
</td>
<td>
<u>Use known number facts – number bonds – adding in tens and ones</u>


I know that 3 + 2 = 5.
So, I know that 3 tens add 2 tens is 5 tens.

Use part whole models and bar models to show understanding.

<table><tr><td colspan="2">50</td></tr><tr><td>30</td><td>20</td></tr></table>
They progress to add the 1s, this can be done in a place value grid or pictorial methods with place value counters – ensure that children are confident with which column they are adding ones to. Show through counters what happens when bridge 9.
</td>
<td>
<u>Use known number facts – number bonds – adding in tens and ones</u>
Write STEM sentences explaining known facts

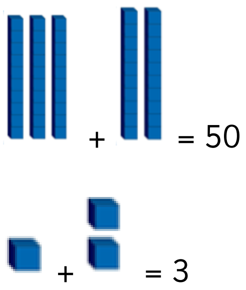
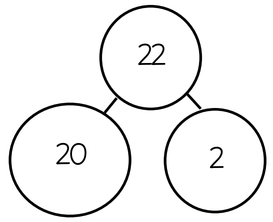
I know that 3 + 5 = 8
So I know that 30 + 50 = 80

To find 32 + 6
I know that 32 is 3 tens and 2 ones. I know that 2 ones add 6 ones is 8 ones. Therefore, I know that 32 + 6 = 30 + 8 = 38
</td>
</tr>
<tr>
<td>
<u>Adding 1 digit number to 2-digit number including bridging 10</u>
Use concrete resources to show how 9 + 6 can be done in steps by completing a 10 and then adding on what is left. Multilink may be useful to partition the amount adding on to complete a ten and show how many are remaining.

</td>
<td>
<u>Adding 1 digit number to 2-digit number including bridging 10</u>
Use pictorial resources, how many to complete a ten, how many are left to add to my 10. Children may find part-whole models useful to partition number they are adding.


</td>
<td>
<u>Adding 1 digit number to 2-digit number including bridging 10</u>
Write equations broken down into partitioned numbers to show how complete a 10 can help when adding numbers.
25 + 6 =
5 + 1
25 + 5 + 1 = 31
</td>
</tr>
</table>

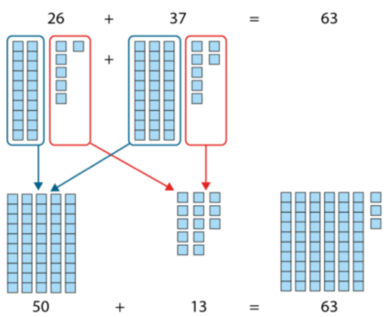
<table>
<tr><td></td><td>There are 2 tens and 5 ones.

I need to add 7. I will use 5 to complete a 10, then add 2 more.</td><td></td><td></td></tr>
<tr><td></td><td><u>Adding up to two 2-digit numbers without exchange</u>
Model using concrete apparatus adding the 10s and 1s separately. Partition numbers into 10s and 1s.

31 + 22 =

50 + 3 = 53
31 + 22 = 53</td><td><u>Adding up to a two 2-digit number without exchange</u>
Use pictorial representations, such as part-whole models. Partition numbers into 10s and ones. Add the 10s and ones separately ensuring children understand the place value for each column and the amount it number is worth.
31 + 22 =

31 + 20 = 51
51 + 2 = 53

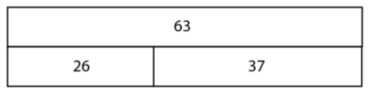
31 + 22 = 53</td><td><u>Adding up to two 2-digit number without exchange</u>
Add tens and 1s separately to answer contextual problems.

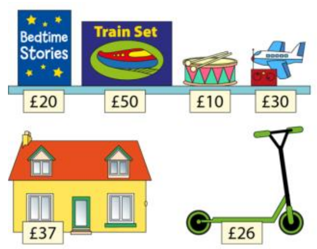
Set out as column method if needed.

Use STEM sentences to support your reasoning.</td></tr>
<tr><td></td><td><u>Adding up to a 2-digit number using exchanging</u>
Use concrete apparatus, such as place value apparatus or dienes to show how we exchange 10 ones for ten.
</td><td><u>Adding a 2-digit number using exchanging</u>

Use pictorial representations to show how we exchange 10 ones for ten when adding. Explore various strategies to add 2 digit numbers, discussing the benefits of each method.
<table><tr><th>Partitioning both addends</th><th>Partitioning one addend</th></tr><tr><td>26 + 37
20 6 30 7

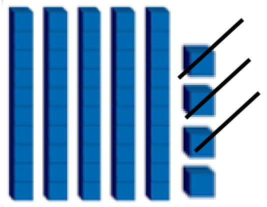
20 + 30 = 50
6 + 7 = 13
50 + 13 = 63</td><td>26 + 37
30 7

26 + 30 = 56
56 + 7 = 63</td></tr><tr><td colspan="2">so £26 + £37 = £63</td></tr></table>
so £26 + £37 = £63</td><td><u>Adding a 2-digit number using exchanging</u>
Add through column method showing exchanging.

Solve contextual problems through adding.
Use STEM sentences to explain reasoning.
Sarah wants to buy the house and the scooter. She has £60, does she have enough? Explain your reasoning.
</td></tr>
<tr><td><u>Subtracting</u></td><td>Concrete</td><td>Pictorial</td><td>Abstract</td></tr>
<tr><td></td><td><u>Subtracting a 2-digit number through understanding of place value to 100</u></td><td><u>Subtracting a 2-digit number through understanding of place value to 100</u></td><td><u>Subtracting a 2-digit number through understanding of place value to 100</u></td></tr>
</table>

<table>
<tr>
<td></td>
<td>Group concrete apparatus into tens and ones. Show these on a place value grid. Partition into tens and ones. Physically take away the amount. If it is crossing tens boundary use apparatus to show how we exchange 10 for 10 ones.

54 - 3



51 left.</td>
<td>Use visual representations such as ten frames, place value boards and grouping pictures into tens and ones. Show when there are 10 ones in the 1s column we exchange for 1 ten. Cross through amount to show how much is remaining.</td>
<td>Solve problems with subtraction including STEM sentences.

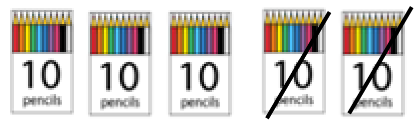
54 - 4 =
? = 54 - 4

I have 34 cakes; I have eaten 3. How many do I have left now?</td>
</tr>
<tr>
<td></td>
<td><u>Use known number facts – number bonds – subtracting tens and ones</u>
Use concrete apparatus to help with using known facts when subtracting. Discuss unitising to subtract 10s and show children place value charts with counters to ensure understanding of which column they are focusing on.

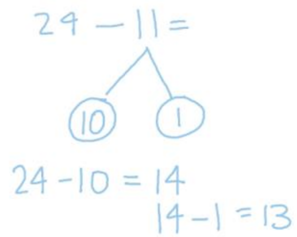
I know that 5 - 2 = 3.
So, I know that 5 tens subtract 2 tens is 3 tens.

Subtracting 1s

26 – 4
I know that 6 – 4 is 2 so I know that 26-4 = 22</td>
<td><u>Use known number facts – number bonds – subtracting tens and ones</u>

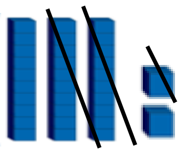
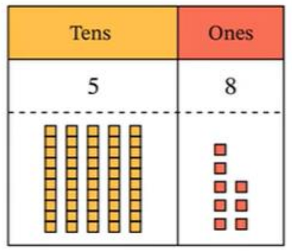
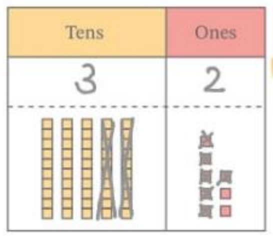
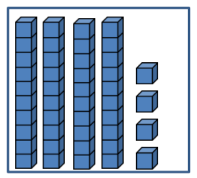
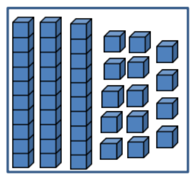
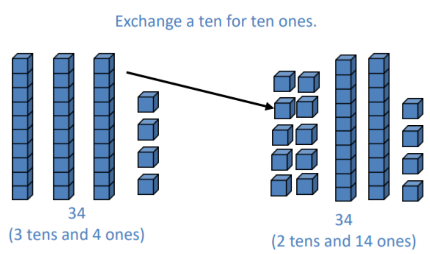
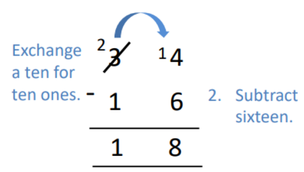

I know that 5 + 3 = 2
So, I know that 3 tens add 2 tens is 5 tens.

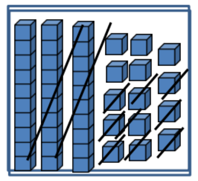
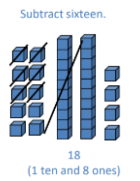
Use part whole models and bar models to show unitising of multiples of 10.

<table><tr><td colspan="2">50</td></tr><tr><td>?</td><td>20</td></tr></table>
Or through use of part-whole model.

</td>
<td><u>Use known number facts – number bonds – subtracting tens and ones</u>
Write STEM sentences explaining known facts

I know that 5 + 3 = 2
So, I know that 50 + 30 = 20

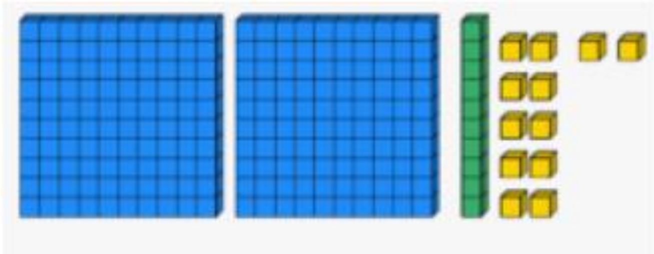
To find 38 – 6
I know that 38 is 3 tens and 8 ones. I know that 8 ones subtract 6 ones is 2 ones.
Therefore, I know that 38 - 6 = 32</td>
</tr>
<tr>
<td></td>
<td><u>Subtracting a 1-digit number bridging 10</u></td>
<td><u>Subtracting a 1-digit number bridging 10</u></td>
<td><u>Subtracting a 1-digit number bridging 10</u></td>
</tr>
</table>

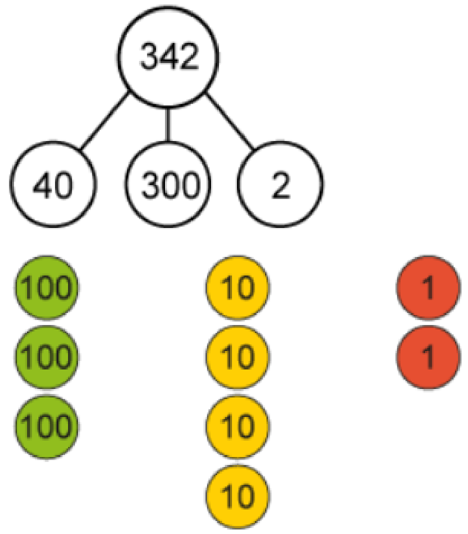
	Use concrete resources to show how when subtracting the use of number bonds can help. 22 – 5. I partition my 5 into 2 and 3. Take away 2 and then know I need to take away 3 more.	Use pictorial resources, use number bond knowledge to partition ones to take away more efficiently.	Complete a 10 using number bonds. Write equations broken down into partitioned numbers to show how complete a 10 can help when subtracting numbers. 34 – 6 =
	<u>Subtracting up to two 2-digit numbers without exchange</u> Model using concrete apparatus subtracting the 10s and 1s separately. Partition numbers into 10s and 1s. Take away or cross out the amount subtracting. **32 – 21 =**  30 – 20 = 10 2 – 1 = 1 So, 32 – 21 = 11	**<u>Subtracting up to a two 2-digit number without exchange</u>** Use pictorial representations, such as part whole models. Partition numbers into 10s and ones. Subtract the 10s and ones separately.  58 – 26 =  Subtract ones and subtract tens.	**<u>Subtracting up to two 2-digit number without exchange</u>** Subtract tens and 1s separately to answer contextual questions. Set out as column method if needed
	<u>Subtracting up to a 2-digit number using exchanging</u> Use place value apparatus to show how we exchange 10 ones for ten when subtracting with exchanges. .  44 – 29 = 	**<u>Subtracting up to a 2-digit number using exchanging</u>** Use pictorial representations to show how we exchange 10 ones for ten when subtracting. 34 – 16 I know that 6 is larget tan 4 so I need to exchange. 	**<u>Subtracting up to a 2-digit number using exchanging</u>** Subtract through column method showing exchanging to solve number problems. I have 34 cakes, I see 16 of them, how many do I have left? 

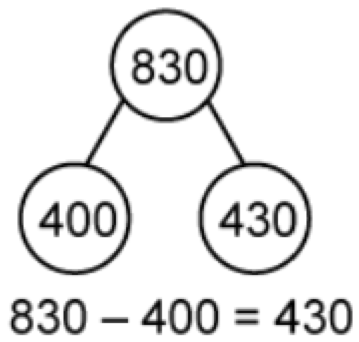
	Exchange 1 ten for ten ones – 30 and 19  Take away 20 + 9 44 – 29 = 15		

<table>
<tr><td colspan="4">Year 3– Addition and subtraction</td></tr>
<tr><td>National Curriculum objectives</td><td>Concrete</td><td>Pictorial</td><td>Abstract</td></tr>
<tr>
<td rowspan="2">

add and subtract numbers mentally, including: a three-digit number and 1s, a three-digit number and 10s, a three-digit number and 100s
add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
estimate the answer to a calculation and use inverse operations to check answers
solve problems, including missing number problems, using number facts, place value, and more

</td>
<td>
<u>Understanding place value to 1000</u>
Sort concrete apparatus into 100s, 10s and 1s.

Children partition with apparatus to embed their understanding of how much each column is worth. Children also continue to unitise to build 3 digit numbers.

Children use standard and non-standard partitioning to show understanding. This enables them to work with friendlier numbers when performing some calculations.
</td>
<td>
<u>Understanding place value to 1000</u>
Create representations of 3 digits numbers. Understand the value of each part of representation and be able to partition into 100s, 10s and 1s.
<table>
<tr><td colspan="3">342</td></tr>
<tr><td>300</td><td>40</td><td>2</td></tr>
</table>


Show pictorially standard and non-standard/ flexible partitioning of 3-digit numbers


</td>
<td>
<u>Understanding place value to 1000</u>

Write equations to show understanding
222 = 200 + 20 + 2

Be able to find missing amounts
222 = 200 + ___ + 2
To be confident in understanding of each column worth

To be able to write equations that show non-standard partitioning.

200 = 200 + 11 + 4

Solve problems relating to subtraction of any single place-value part from the whole number, for example
342 – 300 = □

342 – □ = 302
</td>
</tr>
<tr>
<td><u>Use known facts</u>
Use concrete objects, unitising and known facts to solve equations. I know that 5 + 5 = 10. So I know that 50 + 50 = 100</td>
<td><u>Use known facts</u>
Use pictorial representations to assist number bonds/ facts to 100</td>
<td><u>Use known facts</u>
Find missing numbers and solve problems using known facts

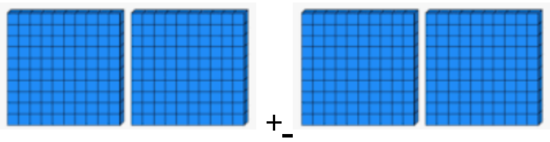
300 + ? = 1100

Apply place-value</td>
</tr>
</table>

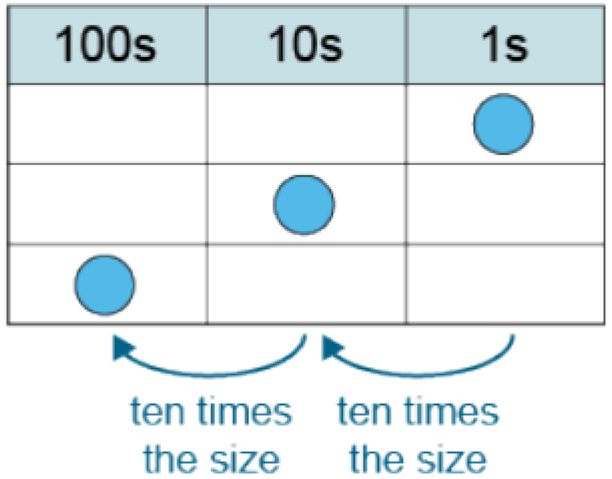
complex addition and subtraction

Use unitising to help with adding 10s, 100s and various amounts.

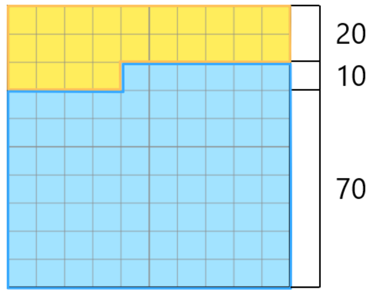
2 + 2 = 4
200 + 200 = 400



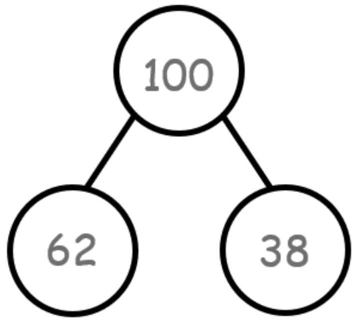
Understand how the scaling relationship between 1s, 10s and 100s can help children them with their known facts.



24 + 76 = 100



Children break down numbers to work help them add more efficiently



62 + 38 = 100
60 2 8 30
10

100	
24	76

knowledge to known additive and multiplicative number facts (scaling facts by 10), for example

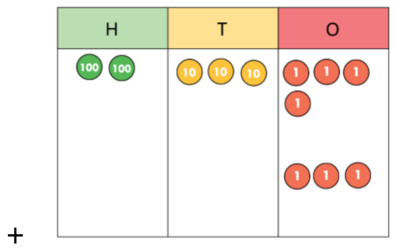
80 + 60 = 140
140 – 60 = 80

Calculate number bonds to 100

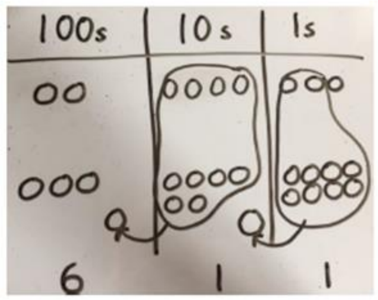
Adding 1s, 10s and 100s – no exchanging
Use place value resources and number bond knowledge to aid understanding of when adding to any of the columns. Children place counters in correct columns of place value chart to increase understanding of place value.

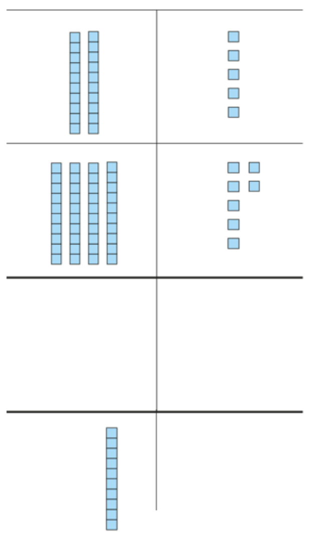
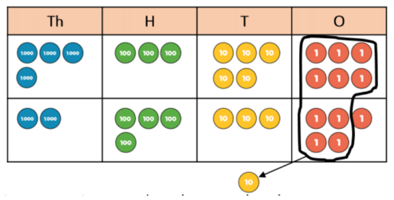
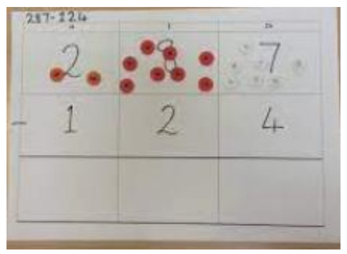
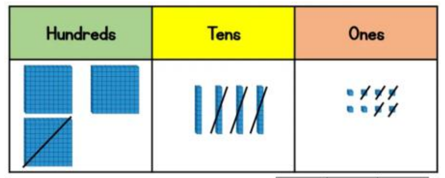
Adding ones
224 + 3 = There are 4 ones and 3 ones altogether. 4 + 3 = 7. In total there are 7 ones. 224 + 3 = 227

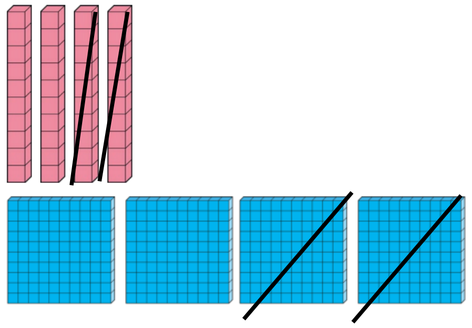
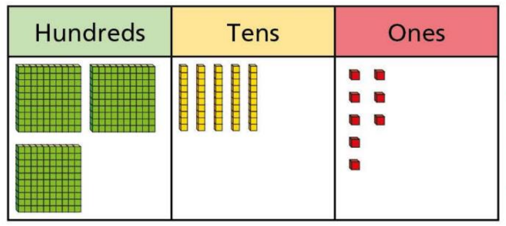
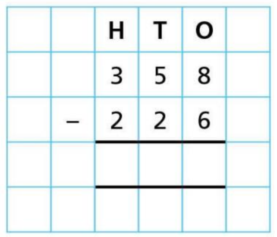
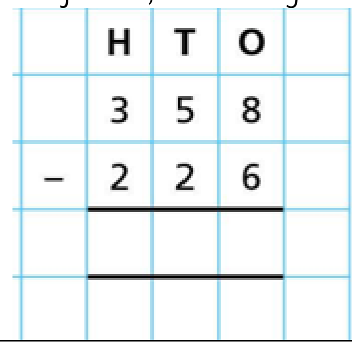
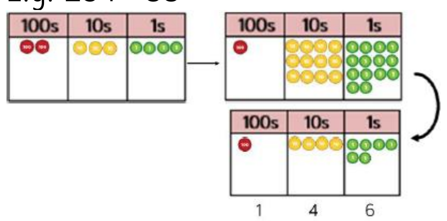
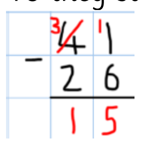
Adding 1s, 10s and 100s – no exchanging
Use pictorial representations to explore adding with no exchanging, especially place value charts.



Adding 1s, 10s and 100s – no exchanging
Calculate mentally by forming the number bond for the 10s. Children write STEM sentences to show their understanding.
753 + 40
I know that 5 + 4 = 9
So, 50 + 40 = 90
753 + 40 = 793

	Adding tens 224 + 50 There are 2 tens and 5 tens altogether. 2+ 5 = 7 In total there are 7 tens. 224 + 50 = 274 **Adding hundreds** 224 + 300 = There are 2 hundreds and 3 hundreds altogether. In total there are 500 hundreds. 224 + 300 = 524		
	Adding 1s, and 10s– exchanging Use place value resources to aid understanding of when adding to any of the columns. Ensure that children are secure in understanding that ten ones = 10, ten tens = 100. Children can use their prior knowledge of bridging to help them. **Adding ones** 224 + 3 = There are 4 ones and 3 ones altogether. 4 + 3 = 7. In total there are 7 ones. 224 + 3 = 227 **Adding tens** 224 + 50 There are 2 tens and 5 tens altogether. 2+ 5 = 7 In total there are 7 tens. 224 + 50 = 274	**Adding 1s, and 10s– exchanging** Use pictorial representations to support children with adding 1s and 10s with exchanging. Understand how to bridge by partitioning the 1st to make the next 10 can help them with their calculation. Ensure children understand the highest digit that can be in each column before exchanging.	**Adding 1s, and 10s– exchanging** Solve word problems adding 1s and 10s with exchanging. Peter scores 168 on a computer game, Tommy scores 7 more points than Peter. How many points does Tommy score? 168 + 7 = 168 + 2 + 5 =
	Formal method - Column addition Model with concrete apparatus up to 3 digits add 2 digits column addition – showing what if a column group is equal to ten or more, we must regroup. 10 ones are equivalent to 1 ten. 10 tens is equivalent to 1 hundred.	**Formal method - Column addition** Use pictorial representations, working up to column method Children to represent the counters in a place value chart, identifying when they make an exchange. 	**Formal method - Column addition** Perform formal column addition ensuring that digits are carried over 25 +48 73 1 Solving problems. There are 319 children at Sir Alexander Fleming Primary and 62 children at their nursery How many children are there altogether?

	 - Use place value counters, as appropriate, to support, especially when having to carry over. 	Progress into column method Start with least significant digit 67 + 24 11 (7+4) + 80 (60+20) 91 "7 add 4 equals 11 and 60 add 20 equals 80. 1+ 0 = 1 and 1 ten + 8 tens = 9 tens"	
Subtraction	**Subtracting from 3 digits - no exchange** Use place value equipment to explore the effect of splitting a whole into parts and understand the link with taking away. 	**Subtracting from 3 digits – no exchange** Show on pictorial representation, split into parts and subtract relevant amounts.  H T O 3 4 8 − 1 3 5	**Subtracting from 3 digits – no exchange** Answer contextual problems using column method.
	Subtract mentally using known facts Use known facts and unitising to subtract multiples of 10 and 100.	**Subtract using known facts** Use known facts and unitising to subtract multiples of 10 and 100	**Subtract using known facts** Use links of known facts and unitising to help solve problems and calculations. Helping to solve equations more efficiently.

	 4 – 2 = 2 40 – 20 = 20 400 – 200 = 200		
	Remodelling strategy (keeping the difference the same) Use concrete apparatus to show how can compensate and adjust numbers to work with friendlier numbers. 352 + 198 350 + 200 = 550	**Remodelling strategy (keeping the difference the same)** Working with friendlier numbers – use pictorial representations to show how remodelling through compensation and adjustment technique can help. 352 + 198 350 + 200 = 550	**Remodelling strategy (keeping the difference the same)** Can solve calculations that require remodelling to create friendlier numbers.
	Subtraction without exchanging up to 3-digit numbers Use concrete apparatus to show subtraction of up to 3 digit numbers by 3 digit numbers. Children to physically take away the amounts they are subtracting.	**Subtraction without exchanging up to 3-digit numbers** Use place value charts and pictorial representations to solve. 358 – 226  	**Subtraction without exchanging up to 3-digit numbers** Solve problems through column subtraction. There are 358 people at a pop concert. 226 are female, how many are male? 
	Subtraction with exchanging up to 3 digit numbers Create column method using place value equipment. Physically take away to leave the difference. Children to physicaly exchange equipment when appropriate.	**Subtraction with exchanging** Column method using pictorial representation. Ensure children are secure exchanging when needed in each column. Column method using place value counters as appropriate. E.g. 234 - 88 	**Subtraction with exchanging** Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11.  They must understand what has happened when they have crossed out the digits.

			$\begin{array}{r} {}^{2}\cancel{3}{}^{1}4 \\ 2 \\ -\ \ 88 \\ \hline 6 \\ \hline \end{array}$

<table>
<tr><td colspan="4">Year 4 – Addition and subtraction</td></tr>
<tr><td>National Curriculum objectives</td><td>Concrete</td><td>Pictorial</td><td>Abstract</td></tr>
<tr>
<td rowspan="2">

add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction
where appropriate estimate and use inverse operations to check answers to a calculation
solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

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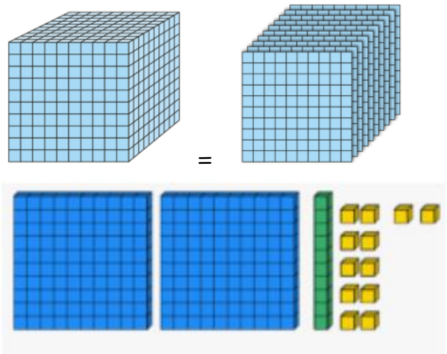
<td>
<u>Understanding place value to 10,000</u>
Sort concrete apparatus into 1000s, 100s, 10s and 1s. Ensure children understand 1000 = 10 x 100

Children partition with apparatus to embed their understanding of how much each column is worth.

Children use standard and non-standard partitioning to show understanding. This enables them to work with friendlier numbers when performing some calculations.
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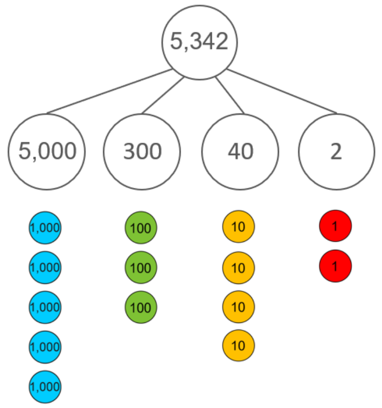
<td>
<u>Understanding place value to 10,000</u>
Create representations of 4 digits numbers. Understand the value of each part of representation and be able to partition into 100s, 10s and 1s.


<table>
<tr><td colspan="4">2342</td></tr>
<tr><td>2000</td><td>300</td><td>40</td><td>2</td></tr>
</table>
Show pictorially standard and non-standard/ flexible partitioning of 4-digit numbers
</td>
<td>
<u>Understanding place value to 10,000</u>
Write equations to show understanding
2342 = 2000 + 300 + 40 + 2

Children write STEM sentences to explain how they know.

Children explore partitioning flexibly to help them solve their calculation, explaining their thinking.

Children solve missing number problems using what they know.
</td>
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<tr>
<td>
<u>Use known facts</u>
Use objects and unitising to use known facts to solve equations using mental methods as well. I know that 5 + 5 = 10. So, I know that 500 + 500 = 1000

Make 1,210 from place value equipment add 3,000
1,210 + 3,000 – I know that 1 + 3 = 4 so it will become 4,210. Use this to support mental calculations of 10, 100 and 1000

Understand how the scaling relationship between 1s, 10s and 100s can help children them with their known facts.
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<td>
<u>Use known facts</u>
Use pictorial representations to assist mental calculations, use place value representations. If I am adding 2,000, which column will change? What will happen if I add 700 to my number? Why is this harder to complete?
<table>
<tr><th>1,000s</th><th>100s</th><th>10s</th><th>1s</th></tr>
<tr><td>1</td><td>4</td><td>0</td><td>0</td></tr>
</table>
</td>
<td>
<u>Use known facts</u>
Use unitising and known facts to support mental calculations.
4,256 + 300 = ?
2 + 3 = 5 200 + 300 = 500
4,256 + 300 = 4,556

Use mental strategies to ensure quick mental addition. When adding 99, it is easier to add 100 and then subtract 1.
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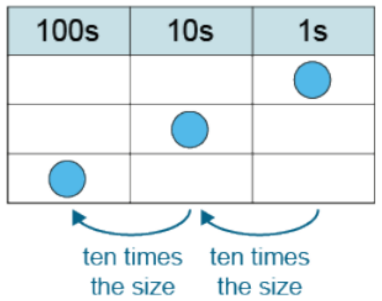
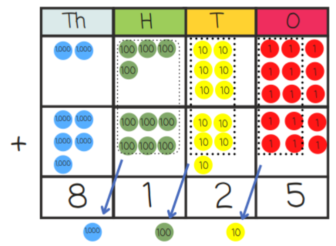
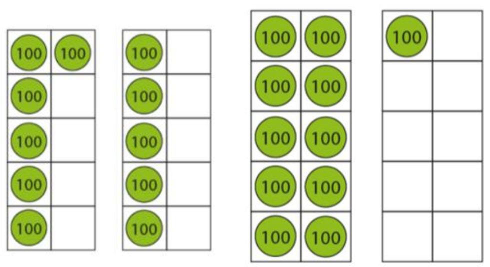
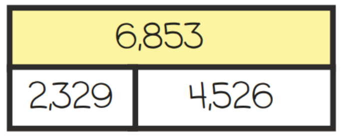
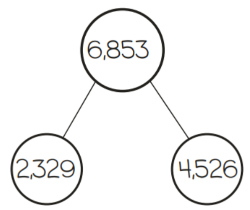
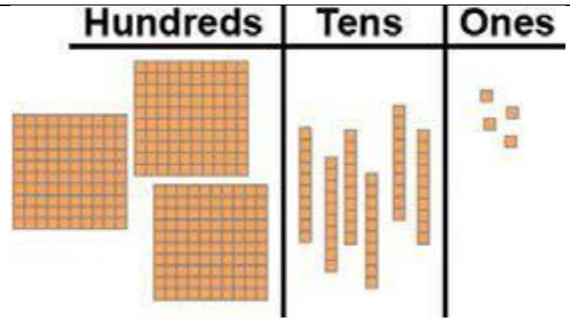
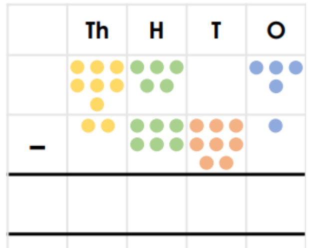
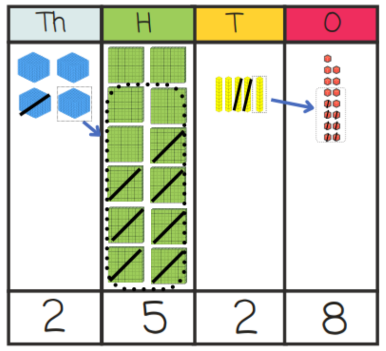
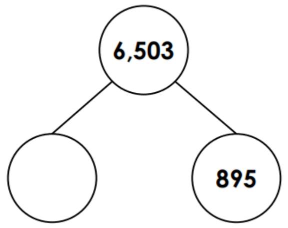
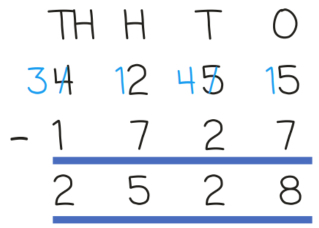
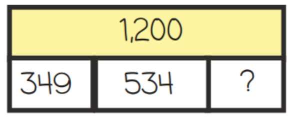
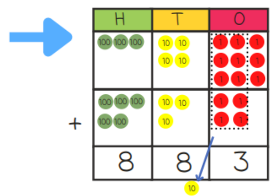
</table>

	Formal method - Column addition
	Model with concrete apparatus up to 4 digits add 3 digits column addition, use practical equipment such as place value chart to undertake column addition.
	
	
	Ensure children understand exchanging process.
	600 + 500 =
	600 + 500= 1,100
	
		Formal method - Column addition
		Use pictorial representations, working up to column method
		
		
		
		
		Use these to help them understand how to check with the inverse.
		
		Progress into column method when ready.
			Formal method - Column addition
			Use formal column addition, including exchanges.
			3,362 + 649= 4,011
			  3, 3 6 2
			+ 6 4 9
			  4, 0 1 1
			   1 1 1
			
			Moving into solving word problems and missing number challenges.

Subtraction	**Mental methods** Using concrete apparatus, unitising and place value charts to show understanding of mental methods.  	**Mental methods** Use pictorial representations such as part-whole models and place value charts to explain mental methods.	**Mental methods** 36 + 83 = 33 + [86] Use mental strategies to help balance calculations. 3 has been subtracted of the first number on the other side, so 3 must be added to the second number to balance the equations.

	My number is 267. If I take away 2 tens, I will be left with 247.	 My number is 364. If I take away 2 hundreds my new number will be 164.	Children explain their mental thinking through the use of STEM sentences.
	Column subtraction with exchanging Use place value equipment to show column addition with exchanging. 	**Column subtraction with exchanging** Children continue pictorial place value charts to show column addition with exchanging. They should also use various other pictorial representations, such as the part whole model and the bar models.  	**Column subtraction with exchanging**  Children answer questions to show their understanding of column subtraction.
	Checking strategies	**Checking strategies** Use bar models to find parts that need calculating through subtractions. Use them to find the difference. 	**Checking strategies** Use bar models to find missing parts. Children are to use the inverse to check the calculation. Use STEM sentences to explain how they have checked their answer.

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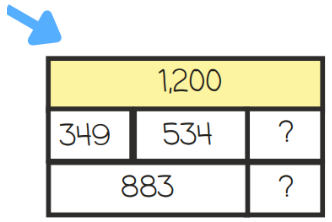
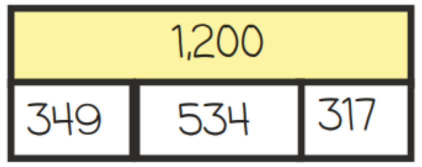
<td>


1,200 – 883 = 317


</td>
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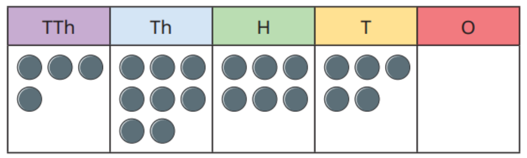
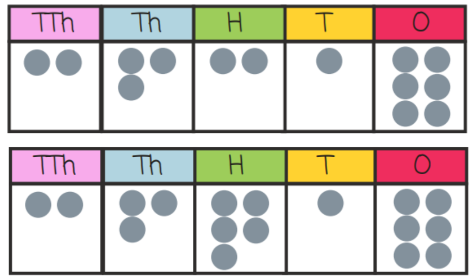
</table>

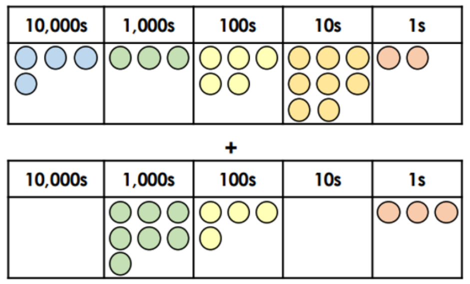
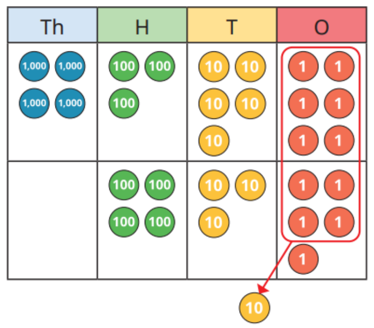
<table>
<tr><td colspan="4">Year 5 – Addition and subtraction</td></tr>
<tr><td>National Curriculum objectives</td><td>Concrete</td><td>Pictorial</td><td>Abstract</td></tr>
<tr><td rowspan="3">
• add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
• add and subtract numbers mentally with increasingly large numbers
• use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</td>
<td><u>Using known facts – mental strategies</u>


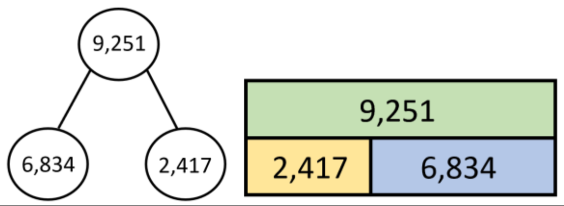
Use a place value chart and their knowledge of number bonds and place value to add multiples of powers of 10. Children unitise to help them complete a calculation.</td>
<td><u>Using known facts – mental strategies</u>


Continue using place value charts and other pictorial representations to help with adding multiples of 10.</td>
<td><u>Using known facts – mental strategies</u>
2,358 - 787 = [2,158] - 587

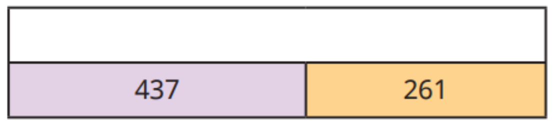
Use mental strategies to help balance calculations. 200 has been subtracted from the first number, so 200 must be subtracted to the second number to keep the difference the same.

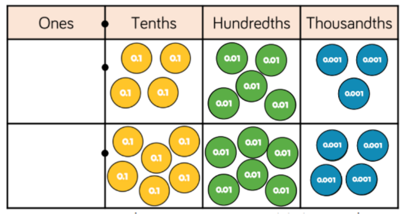
Children use stem sentences to deepen understanding of patterns to help them solve calculations.

I know that when adding _____, I need to look at the ____ column to complete my calculation.</td></tr>
<tr>
<td><u>Column method with whole numbers</u>
Use place value counters to add 2 numbers together. Ensure children understand how to exchange.

</td>
<td><u>Column method with whole numbers</u>
Continue with place value chart pictorial representations ensuring they are secure in exchanging. Ensure children are exposed to other pictorial representations such as part-whole model and bar models.


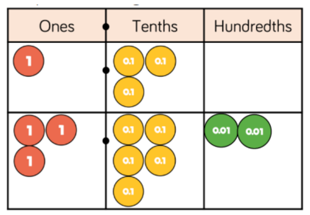

</td>
<td><u>Column method with whole numbers</u>
Children will complete formal written calculations ensuring they are secure with exchanging in more than one column.

  4 3 5 6
+   4 3 5
  4 7 9 1
      1

They will use what they have learnt to find missing answers and to solve worded problems.

</td></tr>
<tr>
<td><u>Adding decimals using column addition</u>
Add decimals using place value equipment with concrete resources.</td>
<td><u>Adding decimals using column addition</u>
Continue with pictorial representations to add decimals. Children use their understanding of tenths as a whole to understand and represent exchange when needed. Children</td>
<td><u>Adding decimals using column addition</u>
Use column addition to add decimals.</td></tr>
</table>



work with calculations where the number of decimals is different number of decimal places to ensure understanding.



$$\begin{array}{r} 1.3 \\ +\ 3.52 \\ \hline \end{array}$$

As continue begin to write calculations in column method.

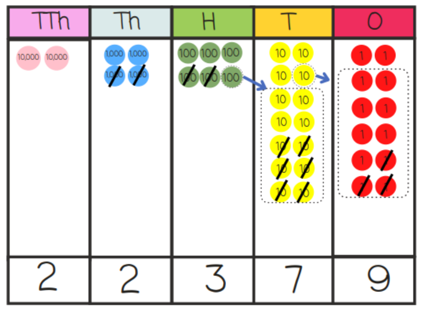
$$\begin{array}{r} 4.55 \\ +\ 3.07 \\ \hline \\ \hline \end{array}$$

Children are to be exposed to column addition where the number of decimal places are different as well as where there are multiple exchanges needed.

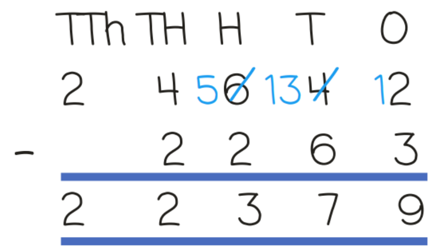
Relate to real life contexts such as money including worded problems.

Subtraction

Column subtraction with whole numbers
Use place value counters and concrete apparatus e.g., dienes to subtract with whole numbers. Ensure that children are exposed to exchanges.



Column subtraction with whole numbers
Continue using pictorial methods for subtraction. Ensure children are exposed to multiple exchanges. Children should start by breaking the calculation down using a place value chart to help them with exchanges.



Children use what they have learnt to find missing numbers.

	5	☐	7	4	3
–	2	9	5	2	☐
	☐	5	2	1	5

Ensure that children are exposed to contextual problem solving, e.g. A factory makes 52,234 cakes, 32, 321 are sent out to shops. An order comes in for 45,456 – how many more cakes do they need to make?

They might use bar models, calculations to problem solve.

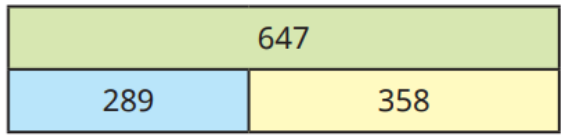
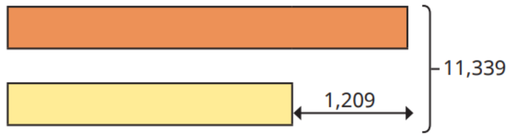
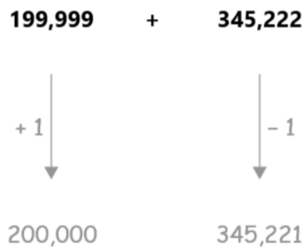
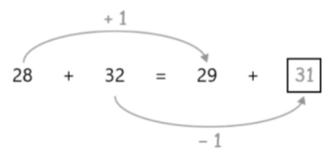
Checking strategies

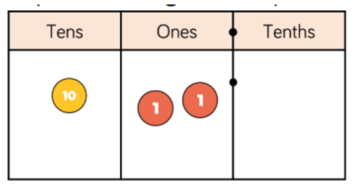
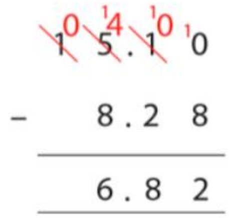
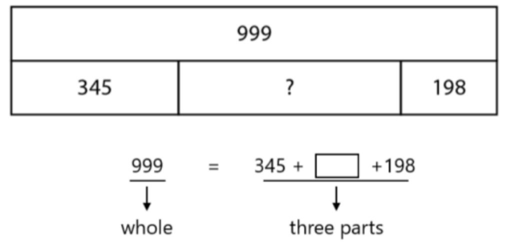
Checking strategies
Children use bar models and inverse to check their answers. They understand that they can find related facts from bar models Children can use bar models or part-whole models to establish families of facts that can be found from one calculation and then use inverse operations to check the accuracy of their calculations.

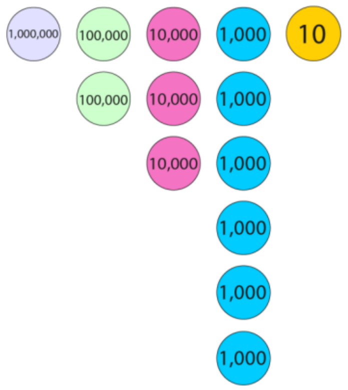
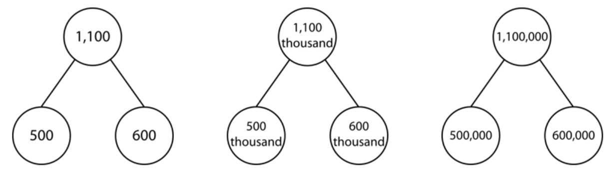
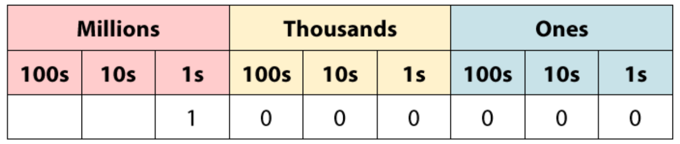
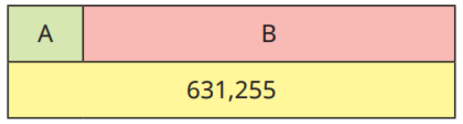
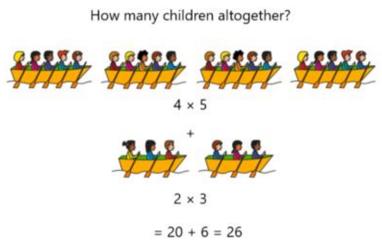
Checking strategies
Children answer multi-step problems and use various strategies to check their answers.

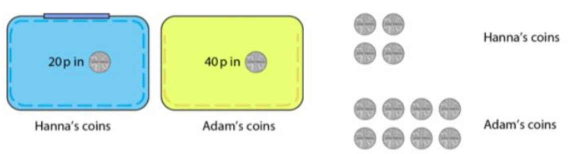
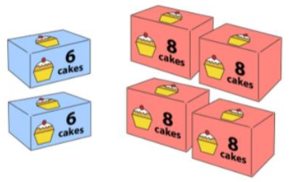
They can break down and explain their steps.

The first step in this problem is ______. I then need to ______ because ______.

		 They use a bar models to find the difference. The sum of two numbers is 11,339, the difference between the two numbers is 1,209. What are the two numbers?  Children choose the most efficient strategy when problem solving.	Children can use estimating skills to justify and check their answers. They can confidently discuss why they have chosen a method.
		<u>Efficient strategies</u> Children use equivalence and compensation strategies to help them perform calculations. 199,999 + 345,222   	<u>Efficient strategies</u> Children can perform a range of calculations, deciding on and justifying that it is the most efficient calculation. They perform mental calculations through use of equivalence and compensation. This also helps children with their estimating.

	<u>Subtracting decimals</u> Use place value charts and counters to subtract using physical equipment. Children work with exchanges to embed their understanding of amounts in a whole.	<u>Subtracting decimals</u> Use pictorial methods alongside calculation to solve subtraction of decimals including subtracting from the whole.  1 2 . – 1 . 2 Moving into column method once they are confident with using pictorial methods.	<u>Subtracting decimals</u> Children will perform column method, including several exchanges.  15.1 – 8.28 = 6.82 Children solve real life contextual problems, such as money through subtracting decimals. Teddy has £12, he spends £1.30 on ice cream and £1.10 on sweets. How much money does he have left?  Children will find missing numbers using strategies they have learnt. They will explain their chosen method and evaluate its efficiency.

Year 6 – Addition and subtraction			
National Curriculum objectives	Concrete	Pictorial	Abstract
• perform mental calculations, including with mixed operations and large numbers • use their knowledge of the order of operations to carry out calculations involving the 4 operations • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why solve problems involving addition, subtraction, multiplication and division • use estimation to check answers to calculations and	<u>Column addition – understanding efficient methods</u> Children perform calculation involving numbers up to 10,000,000. If children are unsure with column method, then support them through using place value charts or place value counters.  1,000,000 + 200,000 + 30,000 + 6,000 + 10 = 1,236,010 Children group them by value and place value order. Children should understand that they can work efficiently when adding certain numbers. Children should also build on their understanding of using known facts to add numbers mentally. This can be done through use of concrete apparatus and a place value chart.	<u>Column addition – understanding efficient methods</u>  Children use pictorial representations to help them with addition.  Continue using place value charts and other pictorial representations to help with adding multiples of 10 when calculating addition efficiently. Ensure children are confident with saying, writing and reading each column in the place value chart. Children should continue to build on their understanding of using known facts to help them solve calculations mentally when appropriate.	<u>Column addition – understanding efficient methods</u> Answer questions that involve column addition or evaluate if they can complete mental calculation efficiently. Solving missing number equations. Expose children to various questions such as what could A and B be? How have you worked out your estimations?  Children write STEM sentences to explain how they have worked out their calculation.
	<u>Understanding order of calculations</u> Use concrete apparatus, such as counters, money to model different interpretations of a calculation with more than one operation. Explore different results so children understand why the order is important. Children use apparatus to explore various methods. Hanna – 20p in 5p coins and Adam has 40p in 5p coins. How many coins do they have altogether?	<u>Understanding order of calculations</u> Use pictorial representation to model calculations using a bar model to demonstrate the correct order of operations in multi-step calculations.  Use contextual style questions and explore the importance of the order of operations.	<u>Understanding order of calculations</u> Children understand why the order of operations is important. They understand how brackets affect the order of operations in a calculation. They understand the correct order of operations in a calculation

determine, in the context of a problem, an appropriate degree of accuracy	 **Method 1:** 20 ÷ 5 + 40 ÷ 5 = 4 + 8 = 12 **Method 2:** 20 ÷ 5 + 40 ÷ 5 = (20 + 40) ÷ 5 = 60 ÷ 5 = 12	2 boxes each contain 6 cakes; 4 boxes each contain 8 cakes. How many cakes altogether?  2 × 6 + 4 × 8 12 + 32 = 44 Use bar models to show order of operations 5 × £1.80 5 × £1.50 | ? £1.80 × 5 − £1.50 × 5 = (£1.80 − £1.50) × 5 = 30p × 5 = £1.50	

Subtraction and using efficient methods

Use place value counters and place value charts to show children how to subtract from numbers up to 10,000,000.

Use counters to demonstrate working with friendlier numbers and how to balance equations.

When appropriate children work out subtractions mentally, this can be explored through place value charts and counters.

Subtraction

Children will look at different strategies to help them work with friendlier number.

200,000 − 158,436 = 41,564

```
  2 0 0 , 0 0 0   --(-1)-->     1 9 9 , 9 9 9
- 1 5 8 , 4 3 6   --(-1)-->   - 1 5 8 , 4 3 5
                                0 4 1 , 5 6 4
```

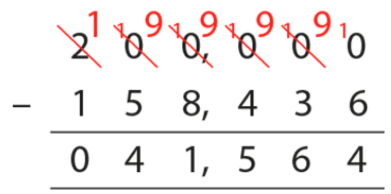
They will use pictorial representations of place value charts of numbers up to 10,000,000 to perform subtractions.

Millions			Thousands			Ones		
100s	10s	1s	100s	10s	1s	100s	10s	1s
		1	0	0	0	0	0	0

Ensure children are secure with reading, writing and saying numbers, use pictorial place value charts to help them subtract efficiently multiples of 10.

Subtraction

Children will subtract using column method with more than one exchange. Can they find more efficient methods through adding or subtracting.



Children solve missing number problems

761,902 = 700,000 + ☐ + 1,000 + 900 + 2

2,124,003 = ☐ + 3

4,800,672 = 4,000,000 + 800,000 + ☐ + 70 + ☐

923,516 = ☐ + 3,000 + 500 + 10 + 6

5,062,100 = 5,000,000 + ☐ + 100

Children complete contextual problems:

In the year 2015, 777,165 babies were born in the UK. 776,352 babies were born in 2014. How many more babies were born in 2015 than 2014?