The Hills Academy

Calculation Policy (2014 Curriculum)

Updated: September 2019
Scheduled Review Date: <September 2020>
(Transition to primary school and Year 6 pupils on roll)

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The Hills Academy Calculation Policy for EYFS-Yr6

Aims

This calculation policy outlines the progression in teaching addition, subtraction, multiplication and division at The Hills Academy in response to the 2014 national curriculum and the transition to primary school status in 2018-19. It aims to:

- Outline age related expectations for addition, subtraction, multiplication and division for each year group within the 2014 National Curriculum
- Ensure that calculation at the school is taught in a consistent and progressive approach
- Provide all stakeholders at the school with an understanding of how calculation is taught in EYFS - Year 6
- Allow parents/carers to support their children at home to align experiences at home and at school
- Provide all children at the school with a tool-kit that they can draw upon and utilise when calculating addition, subtraction, multiplication or division statements

How to use this policy

Attainment Targets

This calculation policy should act as a point of reference for teachers when planning lessons. It should also be a point of reference for parents/carers when supporting their children with maths outside of school. The age related attainment targets listed for each year group inform all stakeholders of what a child should have ideally achieved by the end of that stage of learning. However, a child should not progress onto the written calculation strategies or attainment targets for their current year group if they have not secured attainment targets during previous stages of learning. Progressing onto new attainment targets before securing previous targets will result in gaps in mathematical understanding. This will make it difficult for children to achieve future success in mathematics.

Calculation methods

The progressive methods outlined for each year group aim to provide children with a tool-kit that they can draw upon (if needed) to solve addition, subtraction, multiplication and division statements. Children should not be encouraged or expected to use these written methods to solve all calculations. It is important for children to understand that calculations can be carried out in different ways and that children can use the methods that they are most comfortable with. A child could draw upon known facts and previous learning to solve calculations mentally if they are capable of doing so. For example, a child should not be attempting to solve '100-1=' using written methods. Children could also use jottings to support them. For example, when solving '78+54=' a child may jot down '78+50=128' and then mentally calculate 128+4. A child may use the written methods outlined in this calculation policy to support them whilst calculating. The written methods outlined within this calculation policy should not be viewed as the approach that all children must always use when calculating. Instead they should be viewed as an approach that all children could draw upon and use when calculating if needed.

Concrete-Pictorial-Abstract Approach

Maths at The Hills Academy is taught through a concrete-pictorial-abstract approach and concrete, pictorial and abstract sections have been included for each year group within this calculation policy. However, the concrete, pictorial and abstract elements of teaching calculation should not be viewed as separate and independent elements. Children should use concrete objects and physically do the maths to begin with, then they should be introduced to pictorial representations and see the maths, then they should attempt to 'write out and solve the maths' in abstract representations afterwards. However, this doesn't mean that concrete objects or pictorial representations should be removed or should be unavailable when children progress onto abstract representations. Concrete objects and pictorial representations should remain throughout and be available for children to use when they move onto abstract representations if needed. If a child develops misconceptions when they progress onto abstract representations they should return to concrete-pictorial representations again to address their misconceptions. The different concrete, pictorial and abstract elements should not be viewed as something that is removed as children progress in maths and their understanding increases. Instead, they should be viewed as 3 elements that are displayed together in order to increase mathematical understanding. Children should use concrete objects first, then see pictorial representations, and then progress onto abstract representations but concrete and pictorial representations should not be removed as they progress.

> NCETM Calculation Guidance for schools (2015) states that: '*Children's conceptual understanding and fluency is strengthened if they experience concrete, visual and abstract representations of a concept during a lesson. Moving between the concrete and the abstract helps children to connect abstract symbols with familiar contexts, thus providing the opportunity to make sense of, and develop fluency in the use of, abstract symbols'.*

This calculation policy has only provided examples of some of the concrete, pictorial and abstract representations that children will be exposed to during their schooling to represent number sentences. It is very difficult to provide an example of all of these representations within this calculation policy i.e. dienes blocks, place value counters, part-whole diagram, bar models, ten frames, numicon, multi-link cubes, number lines etc. The resources and pictorial representations displayed within this calculation policy should be used when teaching calculation to children. However, other representations should also be used and the more representations that children are exposed to the better. If a child has only seen number sentences displayed with dienes blocks they may be unable to calculate a number sentence that is displayed with place value counters.

<u>Reasoning and application of understanding</u>

The National Curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

This calculation policy only addresses the first of these aims and is intended to support children with the fundamentals of mathematics when calculating. Children are expected to reason mathematically and solve problems as part of the maths curriculum in years 1-6 and within statutory assessments in years 2 and 6.

This document does not imply that children have secured all of the attainment targets for their current year group if they become fluent in the written methods outlined. Just being fluent in these written methods alone is unlikely to result in a child reaching the expected standard of attainment for mathematics within statutory assessments in years 2 and 6. However, being fluent in the written methods outlined in this calculation policy will allow children to apply their understanding when reasoning mathematically and solving problems.

Children shouldn't just be exposed to calculations displayed in the same way during their experiences of maths in school and at home. They should be expected to solve calculations that are displayed in different ways and they should be expected to apply their understanding to reasoning and problem solving tasks. Ensuring that a range of problem solving tasks are evident in planning and teaching is an expectation at The Hills Academy that is communicated to all teaching staff and is monitored throughout each yearly cycle. Ensuring that mathematical concepts are displayed in different representations and within different contexts is also an expectation communicated to teaching staff at The Hills Academy.

EYFS Addition

Attainment Targets

- Finds the total number of items in two groups by counting all of them
- Finds one more from a group of up to five objects, then ten objects
- Says the number that is one more than a given number
- In practical activities and discussion, beginning to use the vocabulary involved in adding
- Records, using marks that they can interpret and explain.

Calculation begins with practical activities and concrete objects. Pictorial representations and concrete objects should be used or be readily available during every mathematical discussion at this stage of learning. Numbers and symbols can be used at this stage of learning to allow children to begin to develop their understanding of abstract maths. However concrete objects and pictorial representations should always be used alongside numbers and symbols to allow children to understand what '5' means and what the '=' symbol means. Counting reliably is a key skill at this stage of learning that will allow children to achieve future success in mathematics.

Concrete	Pictorial	Abstract
To begin with, children should be asked to identify the number of objects in a pile. It's simple to adults but children need to develop an understanding of what 'five' means or what 'two' means etc. This task should be completed verbally.  *Adult: How many teddy bears are in this pile?* *Child responds and adult supports* When children demonstrate that they can reliably count they can progress onto finding one more than a given number.  *Adult: How many teddy bears are in this pile?* *(Child answers) Put one more teddy bear into the pile and then tell me how many there are.* *Child attempts task and adult supports* Children can then progress onto counting the total number of objects in 2 separate piles. At first, this task should be introduced and answered verbally without symbols or mathematical terminology i.e. 'addition' or 'adding'.  *Adult: How many teddy bears are in each pile?* *Child answers and adult responds and supports* *Adult: How many teddy bears are there altogether?* *Child answers and adult responds and supports*	Children can then progress onto counting the number of objects within pictures that are provided. Numerals should also be displayed alongside the images at this point so children begin to understand what '3' means or what '6' means.  *Adult: How many apples are in this picture?* *Child responds and adults supports* *Adult shows the numeral '3'* Children can then progress onto making their own marks and use the language of 'more' to compare two sets of objects or marks. **6** **2** *Adult: Draw six crosses near to the number 6* *Child attempts and adult supports* *Adult: Draw two crosses near to the number 2* *Child attempts and adult supports* *Adult: Which pile has more crosses?* Children can then progress onto counting the number of objects in two separate piles. Children should attempt to match the correct numeral to each picture and attempt to identify how many objects have been added.  **3** **4** *Adult: How many apples are in each pile?* *Child responds and adult supports* *Adult: Try and match the numbers to the correct pictures* *Child attempts and adult supports* *Adult: How many apples have been added?*	Children can then be introduced to abstract mathematical terminology (addition/adding) and symbols (+, =). Children should count out 2 separate piles of objects and then be asked to count how many objects there are altogether. An adult can place symbols and numerals into the correct place and use the correct mathematical terminology.  **4** $\boxed{+}$ **2** $\boxed{=}$ **6** *Adult: Count out 4 teddy bears* *Child attempts and adult supports* *Adult: Count out 2 teddy bears in a different pile* *Child selects numeral and adult supports* *Adult: How many do we have altogether?* *Child attempts and adult supports.* *Adult: So '4 add 2 equals 6'.* *Adult places symbols and numerals in the correct position* Children can then progress onto placing the symbols and numerals in the correct position themselves in other examples. Eventually a number sentence can be provided to children and they can attempt to calculate the answer. A pile of objects must be readily available for children to use and an adult must read the question aloud using the correct terminology. Children can record numerals and symbols themselves if they are capable of doing so. 5 + 3 = *Adult: What is 5 add 3? Use the pile of teddy bears to help.* *Child attempts and adult support.* *Adult: So 5 + 3 = 8. Can you say that for me please?*

Year 1 Addition

Attainment Targets

- Read, write and interpret mathematical statements involving the addition (+) and equals (=) signs
- Represent and use number bonds within 20
- Add one-digit and two-digit numbers to 20, including 0
- Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as 7 = ? + 2

Counting forwards and backwards to 100 from any given number is a key target at this stage of learning which will allow future success in mathematics. Although children are only expected to add one-digit and two-digit numbers to 20 during year 1, they are expected to count forwards and backwards to 100. They are also expected to recognise and record numbers to 100 in numerals at this stage of learning. This early understanding of place value is a fundamental stepping stone to addition in years 2-6.

<table>
<tr><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
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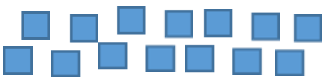
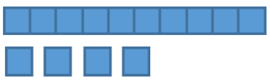
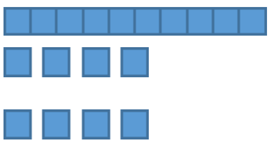
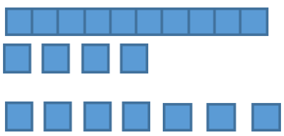
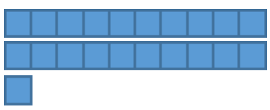
To begin with, children should select the correct number of objects to represent numbers up to 20. The objects that are used can vary but dienes blocks and place value counters are good objects to use.
14

Children can then progress onto selecting the correct number of tens and ones to represent a number to 20. The adult should reinforce that 10 ones = 1 ten.
14

Children can then progress onto selecting the correct number of tens and ones for 2 different numbers and add them together to calculate an answer.
14 + 4 =

This can then progress onto calculating questions that cross a tens boundary and require regrouping. An adult must emphasise that 10 ones = 1 ten and that 10 ones can be exchanged for 1 ten.
14 + 7 =

14 + 7 =

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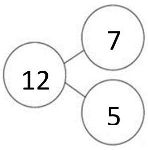
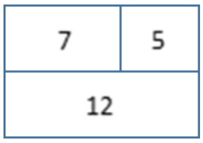
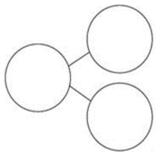
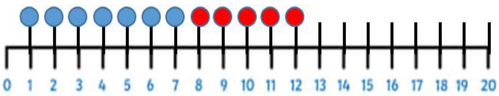
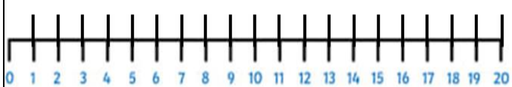
Children can then be shown pictorial representations of addition statements. Children can also draw their own pictures to represent addition statements. The more pictorial representations that children are exposed to the better.





Children could draw 7 dots in one part, 5 dots in the other part and then 12 dots in the whole.
This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling the use of marked number lines.
7 + 5 = 12


Children can then attempt to place the counters onto marked number lines themselves to calculate addition statements. Children should place counters above the numbers whilst adding. Different coloured counters would be useful in supporting children to visualise addition. This will bridge the gap between concrete-pictorial and abstract representations of addition.
8 + 6 =


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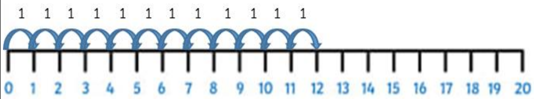
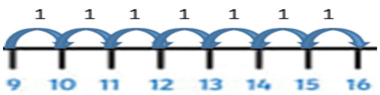
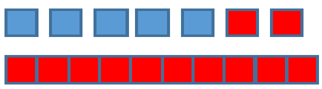
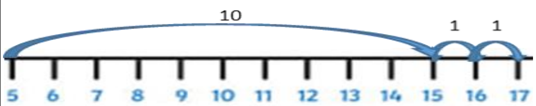
Children can then progress onto using number lines to calculate addition statements. To begin with, number lines should be laminated to allow children to draw their jumps directly onto the number line. Children should add ones to begin with. The value of each jump should be placed above each jump to ensure that children continue to consolidate their understanding of place value.
6 + 6 = 12


Children can then progress onto drawing their own number lines. An adult should model at this stage that children can begin their number lines with the first number of their addition statement. Children should add ones at this stage. The value of each digit should still be placed above each jump.
9 + 7 = 16


This can progress onto children drawing their own number lines starting with the first number of their addition statement and jumping in tens and ones. Concrete objects should be utilised at this stage again to support children in adding ten to a number.
5 + 12 = 17



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Year 2 Addition

Attainment Targets

- Add numbers using concrete objects, pictorial representations and mentally, including a two-digit number and ones, a two-digit number and tens, 2 two-digit numbers, 3 one-digit numbers
- Recall and use addition facts to 20 fluently, and derive and use related facts up to 100
- Show that the addition of 2 numbers can be done in any order (commutative)
- Solve problems with addition, including those involving numbers, quantities and measures, and apply their increasing knowledge of mental and written methods
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Developing a secure understanding of place value in 2 digit numbers is vital at this stage of learning. Concrete objects and pictorial representations should be used to display the value of each digit in two digit numbers i.e. displaying 7 tens and 3 ones alongside the number 73 shows that 7 = 70 and 3 = 3. Children should be able to count forwards and backwards to 100 and recognise the value of each digit in two-digit numbers before progressing onto abstract representations of addition at this stage of learning.

<table>
<tr><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
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To begin with, children should select the correct number of objects to represent numbers up to 100. These objects can vary but dienes blocks and place value counters are good objects to use.

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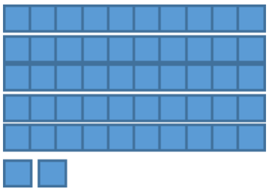
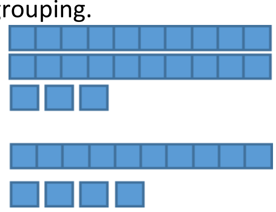


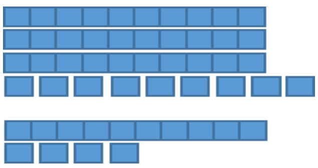
Children can then progress onto selecting the correct number of tens and ones needed to represent 2 different numbers and add them together. To begin with these addition statements should not require regrouping.

23 + 14 =

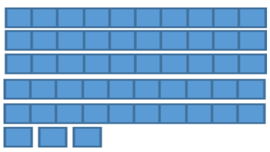


This can then progress onto calculating addition statements that require regrouping. The adult must emphasise that 10 ones = 1 ten and that 10 ones can be exchanged for 1 ten.

39 + 14 =



39 + 14 =



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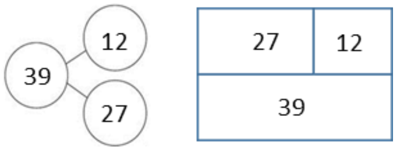
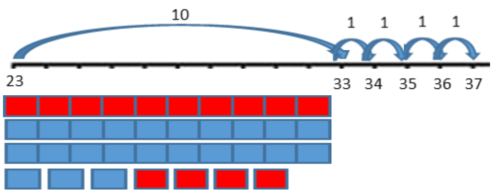
Children will then be shown pictorial representations of addition statements. The more representations that children are exposed to the better.



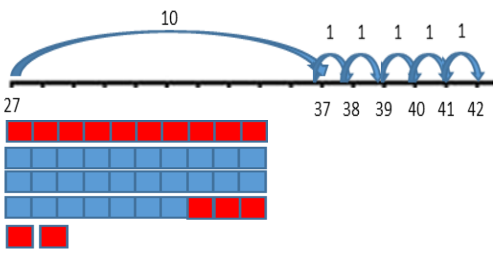
This will then progress onto concrete objects and other pictorial representations being displayed alongside an adult modelling the use of number lines to solve addition statements. These questions should not require regrouping to begin with.

23 + 14 = 37



An adult will then model how to calculate an addition statement that does require regrouping alongside pictorial representations and concrete objects.

27 + 15 = 42



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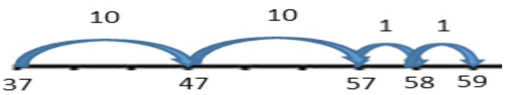
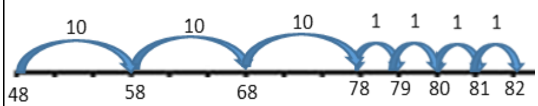
Children can then progress onto drawing number lines to calculate addition statements. Children should be encouraged to start with the largest number first to embed that addition can be calculated in any order. To begin with, questions should not require regrouping and children should be encouraged to jump in tens and ones at this stage.

37 + 22 = 59



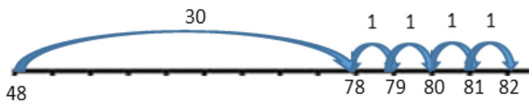
This should then progress onto questions that do require regrouping. The value of each digit should be placed above each jump so children continue to secure a good understanding of place value. Concrete objects should be available for children to use.

48 + 34 = 82



If children are confident they can progress onto jumping in larger multiples of ten and mentally adding numbers but a number line must be used to check their calculation if regrouping is required. Concrete objects should be available for children to use if needed.

48 + 34 = 82



A secure understanding of place value is fundamental to future success in mathematics and children should not progress onto the column method during year 2.

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Year 3 Addition

Attainment Targets

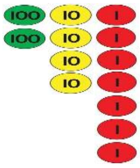
- Add numbers with up to 3 digits, using formal written methods of columnar addition
- Add numbers mentally, including a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds
- Estimate the answer to a calculation and use inverse operations to check answers
- Solve problems, including missing number problems, using number facts, place value, and more complex addition

The use of accurate terminology at this stage of learning is essential if children are going to continue to secure a good understanding of place value within mathematics. Children are introduced to the column method at this stage of learning and numbers that are worth 10 or 100 must not be referred to as 1. In the example in the pictorial section below, 9 + 2 = 11 but an adult must not say that we carry the one because the '1' in '11' is not worth one it is worth ten. Instead an adult must explain that it is worth ten so we place it in the tens column. Children must have a secure understanding of place value in numbers with up to 3 digits before progressing onto the expanded column method.

Concrete

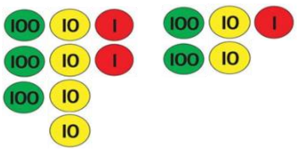
To begin with, children should select the correct number of objects to represent three digit numbers. Dienes blocks or place value counters are good objects to use.

247 =



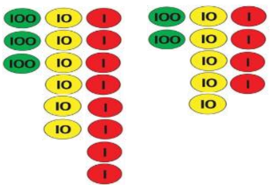
This should then progress onto children adding numbers together through selecting the correcting number of objects to represent each number. To begin with these questions should not require regrouping.

342 + 221 =

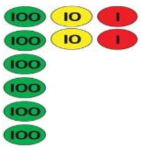


Children can then use objects to solve addition statements that require regrouping. An adult should emphasise that 10 tens = 1 hundred and that 10 tens can be exchanged for 1 hundred at this stage.

368 + 254 =

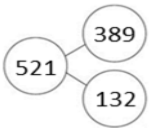


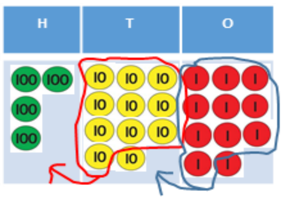
368 + 254 =



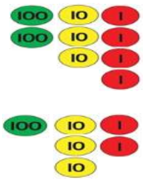
Pictorial

Children will then be shown a variety of pictorial representations of addition statements and can draw their own.



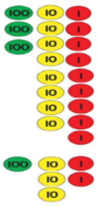


This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling how to use the expanded column method. To begin with these questions will not require regrouping.



$$\begin{array}{rl} 234 & \\ +\ 132 & \\ \hline 6 & (4+2) \\ 60 & (30+30) \\ 300 & (200+100) \\ \hline 366 & \end{array}$$

An adult will then model how to calculate addition statements that do require regrouping using the expanded column method alongside concrete and pictorial representations.



$$\begin{array}{rl} 389 & \\ +\ 132 & \\ \hline 11 & (9+2) \\ 110 & (80+30) \\ 400 & (300+100) \\ \hline 521 & \end{array}$$

Accurate use of terminology when introducing expanded column method is crucial for understanding of place value i.e. 80+30 = 110, we place the additional hundred in the hundreds column.

Abstract

Children can then apply this understanding to abstract representations of addition statements and attempt to solve addition questions using the expanded column method. To begin with these questions should not require regrouping. Concrete objects should be available for children to use.

$$\begin{array}{rl} 250 & \\ +\ 607 & \\ \hline 7 & (0+7) \\ 50 & (50+0) \\ 800 & (200+600) \\ \hline 857 & \end{array}$$

Children can then progress onto using the expanded column method to calculate addition statements that do require regrouping. Concrete objects should be available for children to use if needed.

$$\begin{array}{rl} 476 & \\ +\ 389 & \\ \hline 15 & (6+9) \\ 150 & (70+80) \\ 700 & (400+300) \\ \hline 865 & \end{array}$$

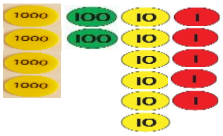
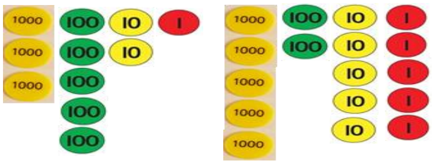
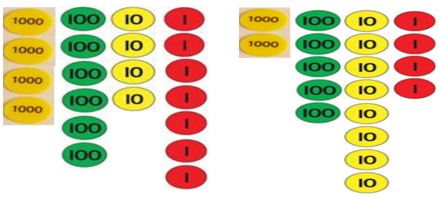
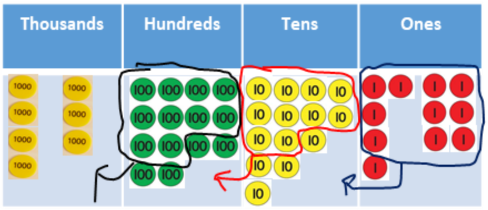
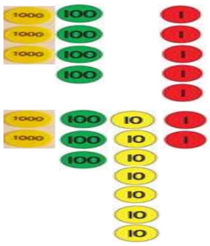
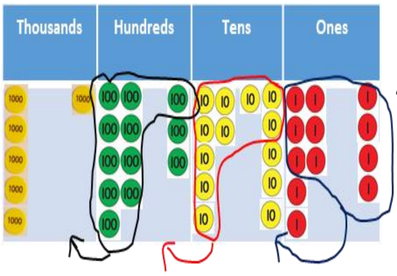
This can progress onto mentally adding numbers, however calculations should be checked using the expanded column method if they require regrouping. Children should not progress onto the compact column method during year 3. They should remain on the expanded method to deepen and consolidate their understanding of place value in numbers with up to 3 digits.

Year 4 Addition

Attainment Targets

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

Children should not progress onto the compact method of column addition at this stage of learning if they have not secured a good understanding of place value in 2, 3 and 4 digit numbers. They should also consolidate their understanding of the expanded column method from year 3 before attempting the compact column method in year 4. Accurate use of terminology when introducing the compact column method is essential if children are going to secure a good understanding of place value and achieve future success in mathematics. In the example in the pictorial section below 900 + 300 = 1,200, an adult must not say that we carry a 1 because the ‘1’ in ‘1,200’ is worth one thousand. Instead an adult should explain that we need to place an additional thousand in the thousands column.

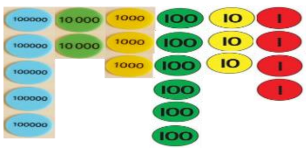
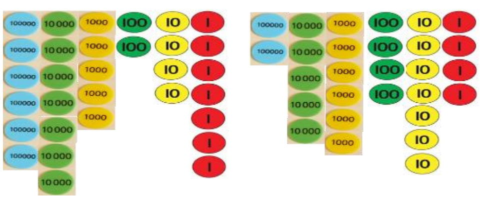
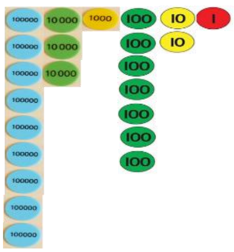
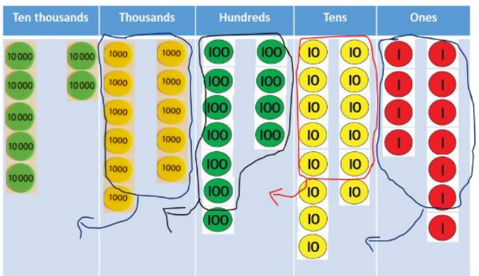
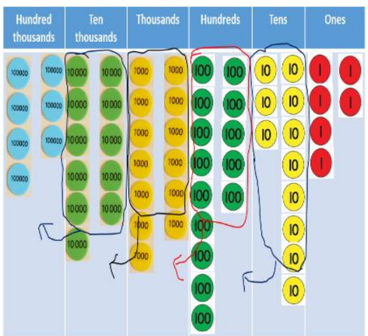
Concrete	Pictorial	Abstract
To begin with children should use place value counters to represent the value of each digit in numbers with up to 4 digits. At this stage of learning place value counters are the most suitable object as numbers are much larger. 4,265 =  Children can then progress onto adding numbers with up to 4 digits by selecting the correct number of objects to represent the value of each digit. To begin with, these questions should not require regrouping. 3,521 + 5,255 = 8,766  This can then progress onto calculating addition statements that do require regrouping. An adult must emphasise at this stage that 10 hundreds = 1 thousand and that 10 hundreds can be exchanged for 1 thousand. 4,647 + 2,584 =  4,647 + 2,584 = 7,231	Children will then be shown a variety of pictorial representations of addition statements and can draw their own. 4895+3656= 8551  This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling how to use the compact column method to calculate addition statements. To begin with, these questions will not require regrouping.  $\begin{array}{r} 3405 \\ +\ 2372 \\ \hline 5777 \end{array}$ An adult will then model how to calculate addition statements that do require regrouping using the compact column method alongside concrete and pictorial representations.  $\begin{array}{r} 5978 \\ +\ 1364 \\ \hline 7342 \\ \hline _{111} \end{array}$ Accurate terminology when introducing compact method is crucial for understanding of place value i.e. 900+300=1,200 instead of 9+3=12.	Children can then apply their understanding to abstract representations of addition statements and add numbers using the compact column method of addition. To begin with these questions should not require regrouping. Concrete objects should be available for children to use. $\begin{array}{r} 5762 \\ +\ 1214 \\ \hline 6976 \\ \hline \end{array}$ This can then progress onto questions that do require regrouping and questions that involve adding more than 2 numbers together. Concrete objects should be available for children to use if needed. $\begin{array}{r} 3563 \\ 2942 \\ +\ 3704 \\ \hline 10209 \\ \hline _{2\ \ 1\ \ } \end{array}$ Children should also progress onto adding numbers with up to 1 decimal place at this stage of learning. An adult should use concrete and pictorial representations when explaining that 1 one = 10 tenths. Children can progress onto mentally adding numbers but they should check their calculations using the compact column method afterwards if regrouping was required. Children should only add numbers with up to 4 digits at this stage of learning and should not progress onto adding numbers with 5 digits until year 5. This will ensure that they deepen their understanding of place value in numbers with up to 4 digits.

Year 5 Addition

Attainment Targets

- Add whole numbers with more than 4 digits, including using formal written columnar methods
- Add 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 multi-step problems in contexts, deciding which operations and methods to use and why

Children should have a secure understanding of place value in 2, 3, 4, 5 and 6 digits numbers before they attempt to use the compact column method to add numbers with up to 6 digits at this stage of learning. Accurate use of terminology is essential for a secure understanding of place value with the ongoing use of the compact column method at this stage of learning. In the example below in the pictorial section 60,000 + 50,000 = 110,000, an adult must not say that we carry the one because the ‘1’ in ‘110,000’ is worth one hundred thousand and not one. Instead an adult must explain that we place the additional hundred thousand in the hundred thousands column.

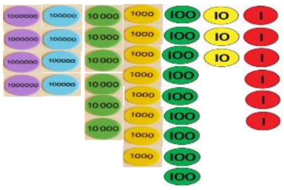
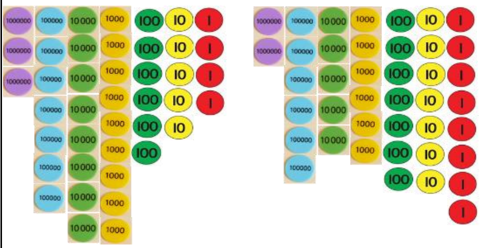
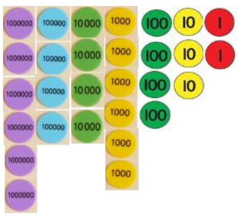
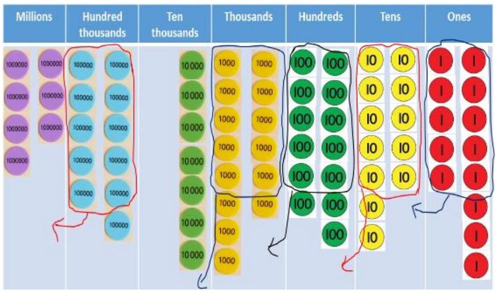
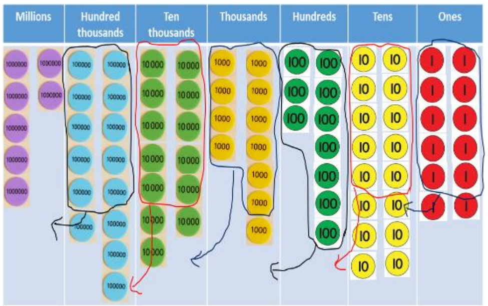
Concrete	Pictorial	Abstract
To begin with children should use place value counters to represent the value of each digit in numbers with up to 6 digits. At this stage of learning place value counters are the most suitable object as numbers are much larger. 523,634=  Children can then progress onto adding numbers with up to 5 and then 6 digits by selecting the correct number of objects to represent each digit in both numbers. An adult must emphasise at this stage that 10 thousands = 1 ten thousand and that 10 ten thousands = 1 hundred thousand. 675,247 + 256,474 =  675,247 + 256,474 = 931,721 	Children will then be shown a variety of pictorial representations of addition statements and can draw their own. 56,784 + 25,467 = 82,251  This will progress onto concrete objects and pictorial representation being displayed alongside an adult modelling how to use the compact column method to calculate addition statements. To begin with these addition statements should contain 5 digits and then progress onto 6 digits.  467,934 + 356,582 824,516 1 1 1 1 Accurate use of terminology throughout the use of the compact column method is essential if children are going to continue to develop their understanding of place value i.e. 60,000 + 50,000 = 110,000 instead of 6 + 5 = 11.	Children can then apply their understanding to abstract representations of addition statements and add numbers using the compact column method of addition. To begin with these questions should not require regrouping. Concrete objects should be available for children to use if needed. 546,120 + 243,175 789,295 This can then progress onto questions that involve the addition of multiple numbers and that require regrouping. 234,963 555,555 + 653,874 1,444,392 1 1 2 1 1 Children should also progress onto adding numbers with up to 2 decimal places at this stage of learning. An adult should use concrete and pictorial representations when explaining that 1 tenth = 10 hundredths. Children can progress onto mentally adding numbers but they should check their calculations using the compact column method afterwards if regrouping was required. Children should only add numbers with up to 6 digits at this stage of learning to ensure that they continue to develop their understanding of place value in numbers with up to 6 digits.

Year 6 Addition

Attainment Targets

- Solve addition multi-step problems in contexts, deciding which operations and methods to use and why
- Solve problems involving addition
- Perform mental calculations, including with mixed operations and large numbers
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Children should have a secure understanding of place value in 2, 3, 4, 5, 6 and 7 digit numbers before they attempt to use the compact column method to add numbers with up to 7 digits at this stage of learning. Accurate use of terminology is essential for a secure understanding of place value with the ongoing use of the compact column method. In the example below in the pictorial section 600,000 + 800,000 = 1,400,000, an adult must not say that we carry the one because the '1' in '1,400,000' is worth one million and not one. Instead an adult must explain that we place the additional million in the millions column.

Concrete	Pictorial	Abstract
To begin with children should use place value counters to represent the value of each digit in numbers with up to 7 digits. At this stage of learning place value counters are the most suitable object as numbers are much larger. 4,478,936 =  Children can then progress onto adding numbers with up to 7 digits by selecting the correct number of objects to represent each digit in both numbers. An adult must emphasise at this stage that 10 hundred thousands = 1 million and that 10 hundred thousands can be exchanged for 1 million. 3,789,654 + 2,656,778 =  3,789,654 + 2,656,778 = 6,446,432 	Children will then be shown a variety of pictorial representations of addition statements and can draw their own. 4,508,675 + 3,676,758 = 8,185,433  This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling how to use the compact column method to add numbers with up to 7 digits.  5,674,386 + 2,867,786 8,542,172 1 1 1 1 1 1 Accurate use of terminology throughout the use of the compact column method is essential if children are going to continue to develop their understanding of place value.	Children can then apply their understanding to abstract representations of addition statements and add numbers using the compact column method of addition. To begin with these questions should not require regrouping. Concrete objects should be available for children to use if needed. 6,441,230 + 3,350,259 9,791,489 This can then progress onto questions that involve the addition of multiple numbers and that do require regrouping. Concrete objects should be available for children to use if needed. 2,258,968 6,960,974 + 4,717,652 13,937,594 1 1 1 2 1 1 Children should also progress onto adding numbers with up to 3 decimal places at this stage of learning. An adult should use concrete and pictorial representations when explaining that 1 hundredth = 10 thousandths. Children can progress onto mentally adding numbers but they should check their calculations using the compact column method afterwards if regrouping was required. Children should only add numbers with up to 7 digits at this stage of learning to ensure that they continue to develop their understanding of place value in numbers with up to 7 digits.

EYFS Subtraction

Attainment Targets

- Count objects to 10, and beginning to count beyond 10
- Finds one less from a group of up to five objects, then ten objects
- Says the number that is one less than a given number
- In practical activities and discussion, beginning to use the vocabulary involved in subtracting
- Records, using marks that they can interpret and explain.

Calculation begins with practical activities and concrete objects. Pictorial representations and concrete objects should be used or be readily available during every mathematical discussion at this stage of learning. Numbers and symbols can be used at this stage of learning to allow children to begin to develop their understanding of abstract maths. However concrete objects and pictorial representations should always be used alongside numbers and symbols to allow children to understand what ‘5’ means and what the ‘=’ symbol means. Counting reliably is a key skill at this stage of learning that will allow children to achieve future success in mathematics.

Concrete	Pictorial	Abstract
To begin with, children should be asked to identify the number of objects in a pile. It’s simple to adults but children need to develop an understanding of what ‘five’ means or what ‘two’ means etc. This task should be completed verbally.  *Adult: How many teddy bears are in this pile?* *Child responds and adult supports* When children demonstrate that they can accurately complete this task they can progress onto finding one less than a given set of objects.  *Adult: Count out 4 teddy bears please.* *(Child attempts) Take one teddy bear away and then tell me how many are left.* *Child attempts task and adult supports* When children are able to count and find one less they should calculate simple subtraction statements provided verbally. Mathematical terminology or symbols shouldn’t be used at this stage. Children should count out a number of objects into a pile and then remove the number of objects requested.  *Adult: Count out 6 teddy bears please.* *Child attempts and adult supports* *Adult: Take 2 bears away and tell me how many are left* *Child attempts and adult supports*	Children can then progress onto counting the number of objects within pictures that are provided. Numerals should also be displayed alongside the images at this point so children begin to understand what ‘3’ means or what ‘6’ means.  *Adult: How many apples are in this picture?* *Child responds and adults supports* *Adult shows the numeral ‘3’* Children can then progress onto making their own marks and use the language of ‘fewer’ to compare two sets of objects or marks. **6** **2** *Adult: Draw six crosses near to the number 6* *Child attempts and adult supports* *Adult: Draw two crosses near to the number 2* *Child attempts and adult supports* *Adult: Which pile has fewer crosses?* Children can then progress onto counting the number of objects in two separate piles. Children should attempt to match the correct numeral to each picture and attempt to identify how many objects have been removed.  **3** **4** *Adult: How many apples are in each pile?* *Child responds and adult supports* *Adult: Try and match the numbers to the correct pictures* *Child attempts and adult supports* *Adult: How many apples have been taken away?*	Children can then be introduced to abstract mathematical terminology (subtraction/subtract) and symbols (-, =). Children should be asked to count out a number of objects into a pile and then remove a certain amount. An adult can place symbols and numerals into the correct place and use the correct mathematical terminology.  **4** $\boxed{-}$ **2** $\boxed{=}$ **2** *Adult: Count out 4 teddy bears.* *Child attempts and adult supports* *Adult: Take 2 away and tell me how many are left.* *Child selects numeral and adult supports* *Adult: So ‘4 subtract 2 equals 2’.* *Adult places symbols and numerals in the correct position* Children can then progress onto placing the symbols and numerals in the correct place themselves in other examples. Eventually a number sentence can be provided to children and they can attempt to calculate the answer. A pile of objects must be readily available for children to use and an adult must read the question aloud using the correct terminology. Children can record numerals and symbols themselves if capable of doing so. 7 - 3 = *Adult: What is 7 subtract 3? Use the pile of teddy bears to help.* *Child attempts and adult supports.* *Adult: So 7 – 3 = 4. Can you say that for me please?*

Year 1 Subtraction

Attainment Targets

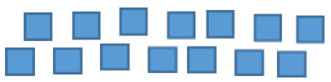
- Read, write and interpret mathematical statements involving the subtraction (-) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Subtract one-digit and two-digit numbers to 20, including 0
- Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as 9 = ? – 2

Counting forwards and backwards to 100 from any given number is a key target at this stage of learning which will allow future success in mathematics. Although children are only expected to subtract one-digit and two-digit numbers to 20 during year 1, they are expected to count forwards and backwards to 100. They are also expected to recognise and record numbers to 100 in numerals at this stage of learning. This early understanding of place value is a fundamental stepping stone to subtraction in years 2-6.

Concrete

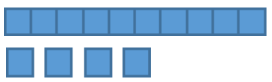
To begin with, children should select the correct number of objects to represent numbers up to 20. The objects that are used can vary but dienes blocks and place value counters are good objects to use.

14



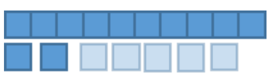
Children can then progress onto selecting the correct number of tens and ones to represent a number to 20. An adult should reinforce that 10 ones = 1 ten.

14



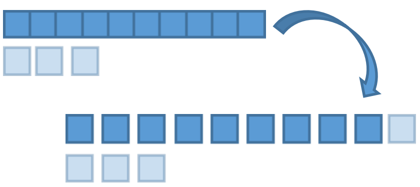
Children can then progress onto calculating subtraction statements using objects. Children should select the correct number of objects to represent each digit in the first number of the subtraction statement and then take away the value of each digit in the second number.

17 – 5 =



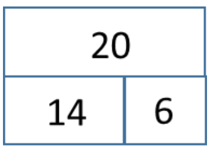
This can then progress onto calculating questions that cross a tens boundary and require regrouping. An adult must emphasise that 1 ten = 10 ones and that 1 ten can be exchanged for 10 ones.

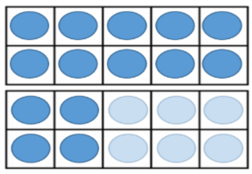
13 - 4 =



Pictorial

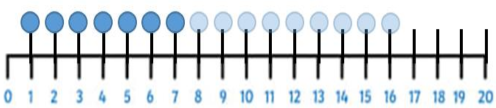
Children will then be shown pictorial representations of subtraction statements and can draw their own. The more pictorial representations that children are exposed to the better.





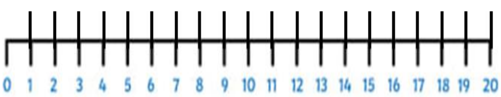
This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling the use of marked number lines with counters.

16 – 9 =



Children can then attempt to place and remove the counters themselves onto marked number lines to calculate subtraction statements. This will bridge the gap between concrete-pictorial and abstract representations of subtraction.

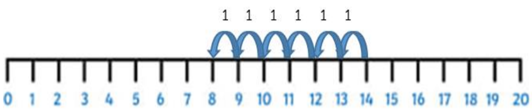
14 - 11 =



Abstract

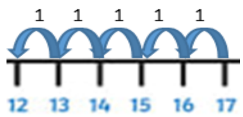
Children can then progress onto using number lines to calculate subtraction statements. To begin with, number lines should be laminated to allow children to draw their jumps directly onto the number line. Children should start at the first number in the subtraction statement and subtract ones to begin with. The value of each jump should be placed above each jump to ensure that children continue to consolidate their understanding of place value.

14 - 6 = 8



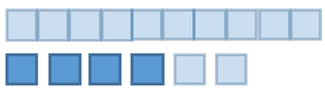
Children can then progress onto drawing their own number lines. An adult should model at this stage that children begin their number lines with the first number of the subtraction statement on the right hand side of the page and number line. This will allow children to jump backwards in ones. The value of each jump should still be placed above each jump.

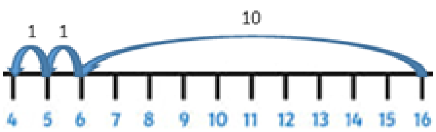
17 – 5 = 12



This can progress onto children drawing their own number lines and jumping in tens and ones. Concrete objects should be utilised at this stage to support children in subtracting ten from a number.

16 - 12 = 4





Year 2 Subtraction

Attainment Targets

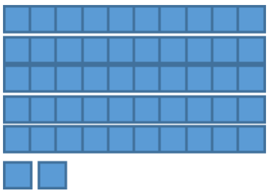
- Subtract numbers using concrete objects, pictorial representations and mentally, including a two-digit number and ones, a two-digit number and tens, 2 two-digit numbers, 3 one-digit numbers
- Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100
- Show that subtraction of 1 number from another cannot be done in any order
- Solve problems with subtraction, including those involving numbers, quantities and measures, and apply their increasing knowledge of mental and written methods
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Developing a secure understanding of place value in 2 digit numbers is vital at this stage of learning. Concrete objects and pictorial representations should be used to display the value of each digit in two digit numbers i.e. displaying 7 tens and 3 ones alongside the number 73 shows that the 7 = 70 and 3 = 3. Children should be able to count forwards and backwards to 100 and recognise the value of each digit in two-digit numbers before progressing onto abstract representations of subtraction at this stage of learning.

<table>
<tr><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>

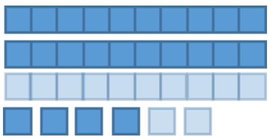
To begin with, children should select the correct number of objects to represent numbers up to 100. These objects can vary but dienes blocks and place value counters are good objects to use.

52



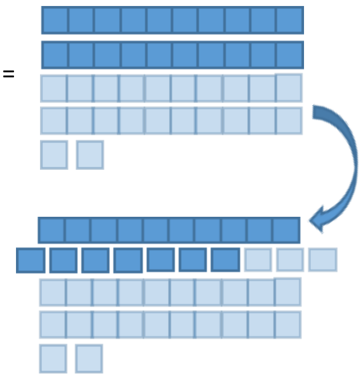
Children can then progress onto using objects to calculate subtraction statements. To begin with, these questions should not require regrouping.

36 – 12 =



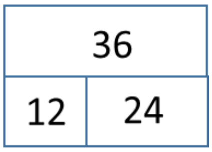
This can progress onto subtraction statements that do require regrouping. An adult must emphasise that 1 ten = 10 ones and that 1 ten can be exchanged for 10 ones.

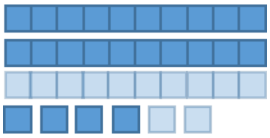
42 – 25 =



</td>
<td>

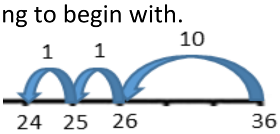
Children will then be shown pictorial representations of subtraction statements and can draw their own. The more representations that children are exposed to the better.





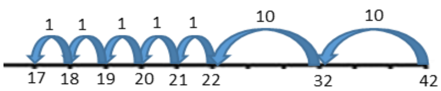
This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling the use of number lines to solve subtraction statements. These questions should not require regrouping to begin with.

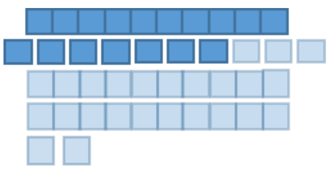
36 - 12 = 24



An adult will then model how to calculate a subtraction statement that does require regrouping alongside pictorial representations and concrete objects.

42 - 25 = 17

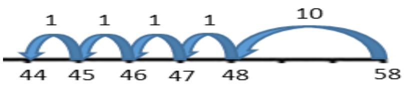




</td>
<td>

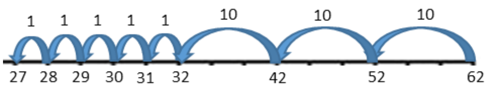
Children can then progress onto drawing their own number lines to calculate subtraction statements. Children should start with the first number of the subtraction statement on the right hand side of their page and number line to embed that subtraction statements cannot be calculated in any order. Children should be encouraged to jump in tens and ones at this stage and questions should not require regrouping to begin with. Concrete objects should be available to use if needed.

58 – 14 = 44



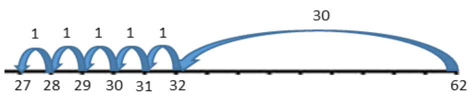
This should progress onto questions that require regrouping. The value of each jump should be placed above each jump so children continue to develop a secure understanding of place value. Concrete objects should be available for children to use if needed.

62 – 35 = 27



If children are confident they can progress onto jumping in larger multiples of ten and mental calculations but number lines should be used to check mental calculations that require regrouping. Concrete objects should be available for children to use if needed.

62 – 35 = 27



A secure understanding of place value is fundamental to future success in mathematics and children should not progress onto the column method during year 2.

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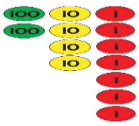
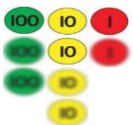
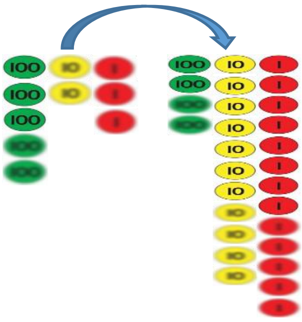
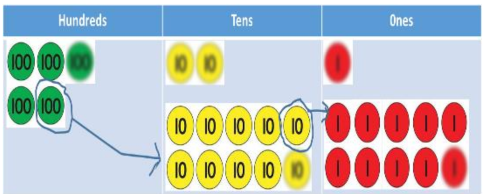
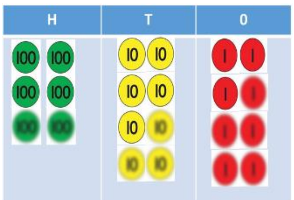
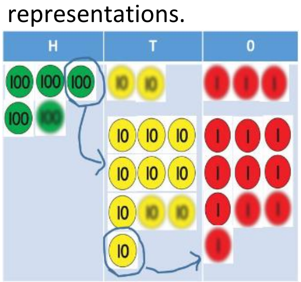
</table>

Year 3 Subtraction

Attainment Targets

- Subtract numbers with up to 3 digits, using formal written methods of columnar subtraction
- Subtract numbers mentally, including a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds
- 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 complex subtraction

The accurate use of terminology at this stage of learning is essential if children are going to continue to secure a good understanding of place value and achieve future success in mathematics. The accurate use of terminology at this stage of learning is essential if children are going to continue to secure a good understanding of place value within mathematics. Children are introduced to the expanded column method at this stage of learning and numbers that are worth 10 or 100 must not be referred to as 1. In the example in the pictorial section below, '110 - 40 = 70' is mathematically correct but '11 – 4 = 7' in the context of the calculation displayed is mathematically incorrect. When using the expanded column method an adult must not say that we steal/borrow/take a 1 from the tens or hundreds columns. Instead, an adult should explain that we exchange 1 hundred for 10 tens or we exchange 10 tens for 10 ones. Children must have a secure understanding of place value in numbers with up to 3 digits before progressing onto the expanded column method.

Concrete	Pictorial	Abstract
To begin with, children should select the correct number of objects to represent three digit numbers. Dienes blocks or place value counters are good objects to use. 247 =  This should then progress onto children calculating subtraction statements through selecting the correct number of objects to represent the value of each digit in the first number and taking away the value of each digit in the second number. To begin with, these questions should not require regrouping. 342 - 221 =  Children can then use objects to solve subtraction statements that require regrouping. An adult should emphasise at this stage that 1 hundred = 10 tens and that 1 hundred can be exchanged for 10 tens. 523 – 245 = 	Children will then be shown a variety of pictorial representations of subtraction statements and can draw their own. 521 – 132 = 389  This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling how to use the expanded column method. To begin with these questions will not require regrouping.  688 - 235 3 (8-5) 50 (80-30) 400 (600-200) 453 An adult will then model how to calculate subtraction statements that do require regrouping using the expanded column method alongside concrete and pictorial representations.  4 11 1 ~~5~~~~2~~3 - 146 7 (13-6) 70 (110-40) 300 (400-100) 377	Children can then apply this understanding to abstract representations of subtraction statements and attempt to solve subtraction questions using the expanded column method. To begin with these questions should not require regrouping. Concrete objects should be available for children to use. 694 - 323 1 (4-3) 70 (90-20) 300 (600-300) 371 Children can then progress onto using the expanded column method to calculate subtraction statements that do require regrouping. Concrete objects should be available for children to use if needed. 6 12 1 ~~7~~~~3~~5 - 367 8 (15-7) 60 (120-60) 300 (600-300) 368 This can progress onto mentally subtracting numbers, however calculations should be checked using the expanded column method if they require regrouping. Children should not progress onto the compact column method during year 3. They should remain on the expanded method to deepen and consolidate their understanding of place value in numbers with up to 3 digits.

Year 4 Subtraction

Attainment Targets

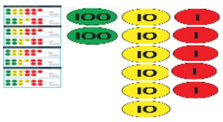
- Subtract numbers with up to 4 digits using the formal written methods of columnar subtraction where appropriate
- Estimate and use inverse operations to check answers to a calculation
- Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why

Children should not progress onto the compact method of column subtraction at this stage of learning if they have not secured a good understanding of place value in 2, 3 and 4 digit numbers. They should also consolidate their understanding of the expanded column method from year 3 before attempting the compact column method in year 4. Accurate use of terminology when introducing the compact column method is essential if children are going to secure a good understanding of place value and achieve future success in mathematics. In the example in the pictorial section below, '1,400 - 700 = 700' is mathematically correct but '14 – 7 = 7' in the context of the calculation displayed is mathematically incorrect. An adult must not say that we borrow/steal/take a 1, instead an adult must explain that we exchange 1 thousand for 10 hundreds or 1 hundred for 10 ones.

Concrete

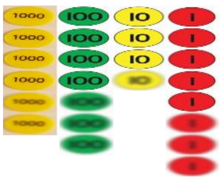
To begin with children should use place value counters to represent the value of each digit in numbers with up to 4 digits. At this stage of learning place value counters are the most suitable object as numbers are much larger.

4,265 =



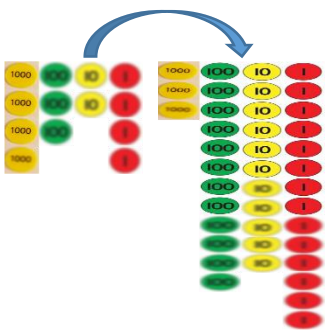
This should then progress onto children calculating subtraction statements through selecting the correct number of objects to represent the value of each digit in the first number and taking away the value of each digit in the second number. To begin with, these questions should not require regrouping.

6748 – 2313 =



Children can then use objects to solve subtraction statements that require regrouping. An adult should emphasise at this stage that 1 thousand = 10 hundreds and that 1 thousand can be exchanged for 10 hundreds.

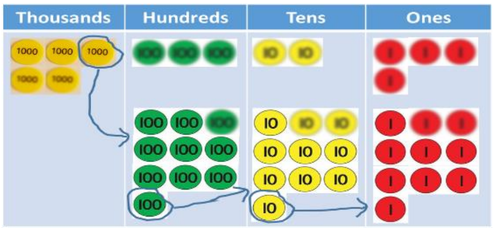
4324-1456=



Pictorial

Children will then be shown a variety of pictorial representations of subtraction statements and can draw their own.

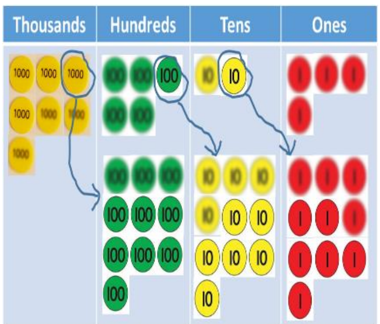
5,324 - 2,446 = 2,878



This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling how to use the compact column method. To begin with these questions will not require regrouping.

$$\begin{array}{r} 8,793 \\ -\ 4,521 \\ \hline 4,272 \end{array}$$

An adult will then model how to calculate subtraction statements that do require regrouping using the compact column method alongside concrete and pictorial representations.



$$\begin{array}{r} 6\ \ 14\ 11\ 1 \\ \cancel{7},\cancel{5}24 \\ -\ 3,758 \\ \hline 3,766 \end{array}$$

Abstract

Children can then apply this understanding to abstract representations of subtraction statements and attempt to solve subtraction questions using the compact column method. To begin with these questions should not require regrouping. Concrete objects should be available for children to use if needed.

$$\begin{array}{r} 9,476 \\ -\ 3,025 \\ \hline 6,451 \end{array}$$

Children can then progress onto using the compact column method to calculate subtraction statements that do require regrouping. Concrete objects should be available for children to use if needed.

$$\begin{array}{r} 8\ \ 9\ \ 1\ 17\ 1 \\ \cancel{9},\cancel{0}\cancel{8}2 \\ -\ 5,695 \\ \hline 3,387 \end{array}$$

Children should also progress onto subtracting numbers with up to 1 decimal place at this stage of learning. An adult should use concrete and pictorial representations when explaining that 1 one = 10 tenths.

This can progress onto mentally subtracting numbers, however calculations should be checked using the compact column method if they require regrouping. Children should not progress onto subtracting numbers with up to 5 digits at this stage of learning. Instead they should deepen and consolidate their understanding of place value in numbers with up to 4 digits.

Year 5 Subtraction

Attainment Targets

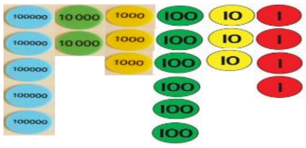
- Subtract whole numbers with more than 4 digits, including using formal written columnar methods
- Subtract numbers mentally with increasingly large numbers
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Children should have a secure understanding of place value in 2, 3, 4, 5 and 6 digits numbers before they attempt to use the compact column method to subtract numbers with up to 6 digits at this stage of learning. Accurate use of terminology with the ongoing use of the compact column method is essential if children are going to secure a good understanding of place value and achieve future success in mathematics. In the example in the pictorial section below, '110,000 – 60,000 = 50,000' is mathematically correct but '11 – 6 = 5' in the context of the calculation displayed is mathematically incorrect. An adult must not say that we borrow/steal/take a 1, instead an adult must explain that we exchange 1 hundred thousand for 10 ten thousands or 1 ten thousand for 10 thousands.

Concrete

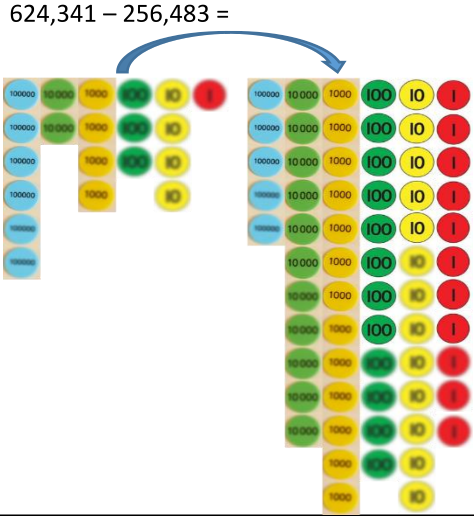
To begin with children should use place value counters to represent the value of each digit in numbers with up to 6 digits. At this stage of learning place value counters are the most suitable object as numbers are much larger.

523,634=



Children can then progress onto subtracting numbers with up to 5 and then 6 digits by selecting the correct number of objects to represent each digit in the first number and taking away the value of each digit in the second number. An adult must emphasise at this stage that 1 hundred thousand = 10 ten thousands and that 1 hundred thousand can be exchanged for 10 ten thousands.

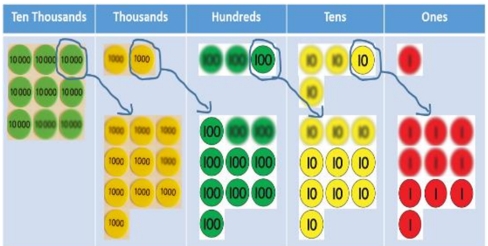
624,341 – 256,483 =



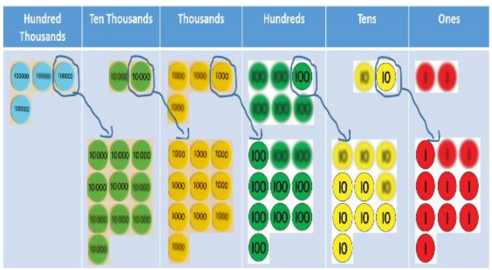
Pictorial

Children will then be shown a variety of pictorial representations of subtraction statements and can draw their own.

92,341 - 25,467 = 66,874



This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling how to use the compact column method to calculate subtraction statements. To begin with these subtraction statements should contain 5 digits and then progress onto 6 digits. They should not require regrouping to begin with and then progress onto subtraction statements that do require regrouping.



$$\begin{array}{r} {}^{3}\cancel{4}\,{}^{11}\cancel{2}\,{}^{13}\cancel{4},{}^{15}\cancel{6}\,{}^{11}\cancel{2}\,{}^{1}2 \\ -\;165,754 \\ \hline 258,868 \\ \hline \end{array}$$

Abstract

Children can then apply their understanding to abstract representations of subtraction statements and subtract numbers using the compact column method of subtraction. To begin with these questions should not require regrouping. Concrete objects should be available for children to use if needed.

$$\begin{array}{r} 424,622 \\ -\;165,754 \\ \hline 258,868 \\ \hline \end{array}$$

This can then progress onto questions involving the subtraction of multiple numbers that do require regrouping.

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{11}\cancel{2}\,{}^{12}\cancel{3},{}^{1}4\,{}^{2}\cancel{3}\,{}^{1}4 \\ -\;246,526 \\ \hline {}^{6}\cancel{3}\,{}^{1}\cancel{7}6,{}^{8}\cancel{9}\,{}^{1}08 \\ -\;158,235 \\ \hline 218,673 \\ \hline \end{array}$$

Children should also progress onto subtracting numbers with up to 2 decimal place at this stage of learning. An adult should use concrete and pictorial representations when explaining that 1 tenth = 10 hundredths.

Children can progress onto mentally subtracting numbers but they should check their calculations using the compact column method afterwards if regrouping was required. Children should only subtract numbers with up to 6 digits at this stage of learning to ensure that they continue to develop their understanding of place value in numbers with up to 6 digits.

Year 6 Subtraction

Attainment Targets

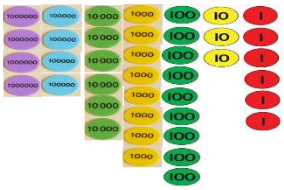
- Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Solve problems involving subtraction
- Perform mental calculations, including with mixed operations and large numbers
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Children should have a secure understanding of place value in 2, 3, 4, 5, 6 and 7 digit numbers before they attempt to use the compact column method to add numbers with up to 7 digits at this stage of learning. Accurate use of terminology is essential for a secure understanding of place value with the ongoing use of the compact column method. In the example in the pictorial section below, '1,300,000 – 600,000 = 700,000' is mathematically correct but '13 – 6 = 7' in the context of the calculation displayed is mathematically incorrect. An adult must not say that we borrow/steal/take a 1, instead an adult must explain that we exchange 1 million for 10 hundred thousands.

Concrete

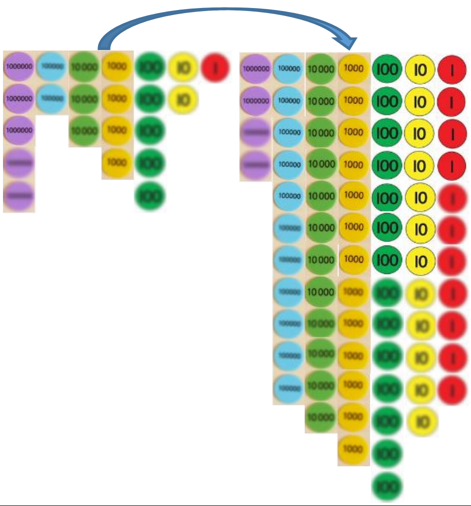
To begin with children should use place value counters to represent the value of each digit in numbers with up to 7 digits. At this stage of learning place value counters are the most suitable object as numbers are much larger.

4,478,936 =



Children can then progress onto subtracting numbers with up to 7 digits by selecting the correct number of objects to represent each digit in the first number and taking away the value of each digit in the second number. An adult must emphasise at this stage that 1 million = 10 hundred thousands and that 1 million can be exchanged for 10 hundred thousands.

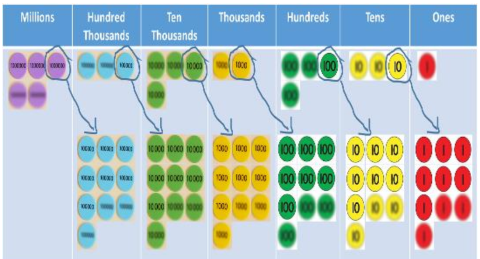
5,234,531 – 2,646,757 =



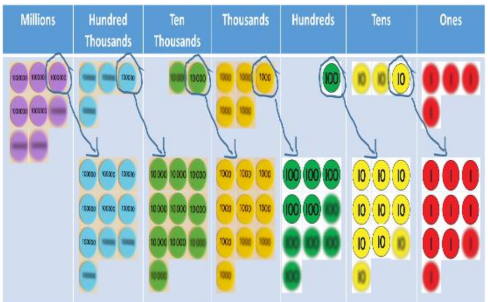
Pictorial

Children will then be shown a variety of pictorial representations of subtraction statements and can draw their own.

5,342,431 – 2,564,654 =



This will progress onto concrete objects and pictorial representations being displayed alongside an adult modelling how to use the compact column method to calculate subtraction statements. To begin with these subtraction statements should not require and should then progress onto subtraction statements that do require regrouping.



$$\begin{array}{r} {\scriptstyle 7\ \ 13\ \ 11\ 14\ \ 10\ \ 12\ \ 1} \\ 8,425,134 \\ -\ 3,637,546 \\ \hline 4,787,588 \\ \hline \end{array}$$

Abstract

Children can then apply their understanding to abstract representations of subtraction statements and subtract numbers using the compact column method of subtraction. To begin with these questions should not require regrouping. Concrete objects should be available for children to use if needed.

$$\begin{array}{r} 7,565,746 \\ -\ 3,243,521 \\ \hline 4,322,225 \\ \hline \end{array}$$

This can then progress onto questions involving the subtraction of multiple numbers that do require regrouping.

$$\begin{array}{r} {\scriptstyle 7\ \ 13\ 11\ 10\ \ 12\ 13\ 1} \\ 8,421,345 \\ -\ 2,634,567 \\ \hline {\scriptstyle 7\ 15\ \ \ 1\ \ 6\ \ 1} \\ 5,786,778 \\ -\ 3,058,959 \\ \hline 2,727,819 \\ \hline \end{array}$$

Children should also progress onto subtracting numbers with up to 3 decimal place at this stage of learning. An adult should use concrete and pictorial representations when explaining that 1 hundredth = 10 thousandths.

Children can progress onto mentally subtracting numbers but they should check their calculations using the compact column method afterwards if regrouping was required. Children should only subtract numbers with up to 7 digits at this stage of learning to ensure that they continue to develop their understanding of place value in numbers with up to 7 digits.

Year 1 Multiplication

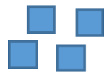
Attainment Targets:

- Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- Count in multiples of 2's, 5's and 10's

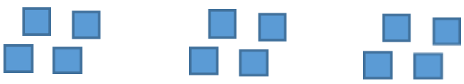
Counting in multiples of 2, 5 and 10 from 0 is a key skill at this stage of learning that will allow future success in mathematics. Although children are only required to calculate multiplication statements using concrete objects and pictorial representations at this stage of learning, calculating multiplication statements using counting strategies can be encouraged at this stage of learning (if children have demonstrated that they can accurately calculate multiplication statements using concrete objects and pictorial representations initially). Multiplication features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is fundamental to future success in mathematics.

Concrete

To begin with, children should select the correct number of objects to represent numbers up to 10. The objects that are used can vary but dienes blocks and place value counters are good objects to use.

4 

Children can then progress onto selecting the correct number of objects a certain number of times. To begin with, this task should be completed verbally and practically without the 'x' symbol.



Adult: Can you put 4 ones in a pile?
Child attempts and adult supports
Adult: Can you put 4 ones into 3 separate piles?

This can then progress onto an adult displaying the multiplication symbol alongside the objects. The adult should explain at this stage that the 'x' symbol means lots of/groups of.

3 x 5 = 

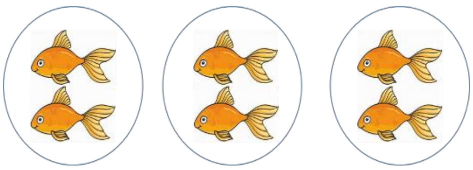
Adult: The 'x' symbol means lots of/groups of.
Adult: Create 3 groups of 5.
Child attempts and adult supports

Children can then attempt to accurately select objects to represent other multiplication statements. Children should remain on multiplying numbers with 1 digit at this stage of learning i.e. representing statements no larger than 9x9=.

Pictorial

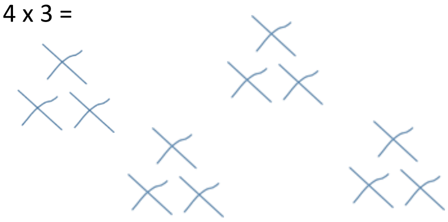
Children can then be shown pictorial representations alongside multiplication statements. The more pictorial representations that children are exposed to the better.

3 x 2 =

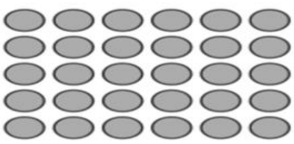


This can then progress onto children drawing their own representations of multiplication statements i.e. children could draw groups of dots or crosses onto whiteboards to visually represent multiplication statements.

4 x 3 =



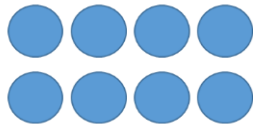
An adult can then model how to arrange objects into arrays to represent multiplication statements. An adult should emphasise at this stage that children are still solving multiplication statements and that the 'x' symbol still means the same thing. The only difference is that we are now arranging the objects into 'neat rows called arrays'.

5 x 6 = 

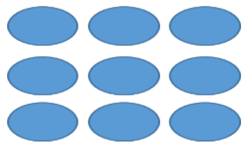
This makes the objects easier to count and at a later stage of maths will support children in beginning to use counting strategies to solve multiplication statements.

Abstract

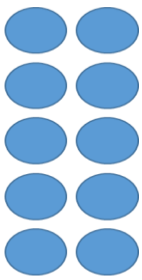
Children can then progress onto arranging objects into arrays with adult support to calculate multiplication statements.

2 x 4 = 8 

Children can then progress onto arranging objects into arrays to calculate multiplication statements independently.

3 x 3 = 9 

If understanding is good, children can use counting strategies when calculating multiplication statements within the 2 and 5 times tables alongside arrays. Children are taught to counting in multiples of 2 and 5 at this stage of learning.

5 x 2 = 10 

Adult: How many objects are in each row?
Child answers and adult supports.
Adult: Rather than counting each object individually, could you count in multiples of 2 instead?
Child attempts and adult supports.

Children should only multiply single digit numbers at this stage of learning to ensure that they develop a secure understanding of early multiplication. Multiplication features frequently on statutory assessments in years 2 and 6.

Year 2 Multiplication

Attainment Targets:

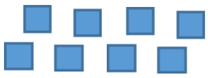
- Count in multiples of 2, 3, 5 and 10 from 0
- Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
- Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- Show that multiplication of two numbers can be done in any order (commutative)
- Solve problems involving multiplication using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts

Counting in multiples of 2, 3, 5 and 10 from 0 is a key skill at this stage of learning that will allow future success in mathematics. Showing children that multiplication is commutative and can be done in any order, through the use of concrete objects and pictorial representations, is another key skill at this stage of learning that will allow future success in mathematics. This will support children in calculating multiplication statements using mental and written methods during later stages of learning. Multiplication features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

Concrete

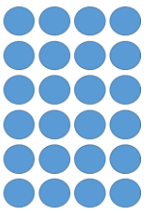
To begin with, children should select the correct number of objects to represent numbers up to 20. These objects can vary but dienes blocks and place value counters are good objects to use.

8



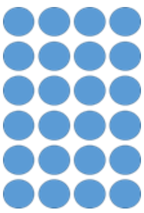
Children can then progress onto using concrete objects arranged into arrays to calculate multiplication statements.

6 x 4 = 24

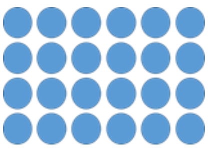


Children should be encouraged at this stage to investigate whether 6x4 and 4x6 will provide them with the same answer. This will allow them to discover that multiplication is commutative and can be calculated in any order.

6 x 4 = 24



4 x 6 = 24

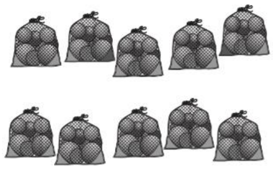


Rather than counting each object individually, children should be encouraged to count in multiples of 2, 3, 5 and 10 when calculating multiplication statements within these multiplication tables.

Pictorial

Children will then be shown pictorial representations of multiplication statements. The more representations that children are exposed to the better.

10 balls are inside each bag

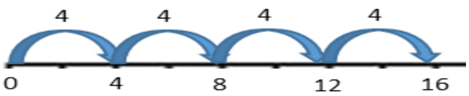


Children can then progress onto drawing their own pictorial representations of multiplication statements. Children will be exposed to pictorial representations of multiplication statements that are not arranged into rows/arrays during their learning. Therefore, children do not always have to draw their representations into arrays.

4 x 4 = 16

An adult will then model how to use a number line to calculate multiplication statements alongside concrete and pictorial representations. An adult should emphasise at this stage of learning that multiplication is the same as repeated addition.

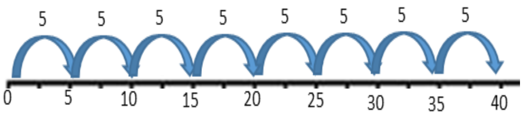
4 x 4 = 16



Abstract

Children can then progress onto using number lines to calculate multiplication statements through repeated addition. An adult should emphasise at this stage of learning that multiplication is commutative and can be done in any order. Pupils should repeatedly add the number that they are most comfortable counting in. In the example below, children are taught to count in multiples of 5 at this stage of learning but not in multiples of 8. They are likely to be more comfortable counting or adding multiples of 5. They should be encouraged to do this.

5 x 8 = 40



If understanding is good, children can progress onto using counting strategies and mental methods to calculate multiplication statements within the 2, 3, 5 and 10 multiplication tables. Children are taught to count in these multiples at this stage of learning.

8 x 2 = 16

The child can record this multiplication statement straight away without the use of a number line if they are confident to do so. They can count in 2's 8 times or re-call/remember this multiplication fact.

Children can progress onto multiplying a 2 digit number by a 1 digit number at this stage of learning if understanding is good i.e. 12x5=.

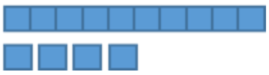
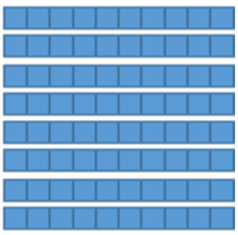
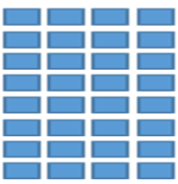
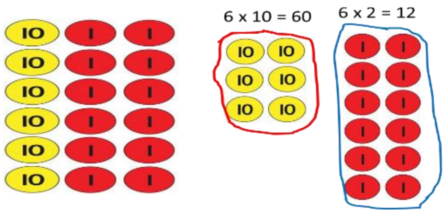
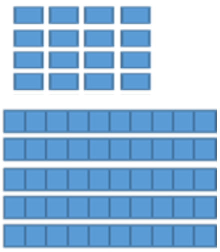
Multiplication features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

Year 3 Multiplication

Attainment Targets:

- Count in multiples of 2, 3, 5, 10, 4 and 8 from 0
- Recall and use multiplication facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- Solve problems involving multiplication, including missing number problems, positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Counting in multiples of 2, 3, 5, 10, 4 and 8 from 0 is a key skill at this stage of learning that will allow future success in mathematics. Children are introduced to the expanded column method of multiplication at this stage of learning and correct use of terminology is important if children are going to continue to develop a secure understanding of place value. Numbers that are worth 10 must not be referred to as 1. In the example in the pictorial section below, the ‘1’ in ‘15’ is worth 10, it is not worth 1. An adult must not say ‘1 x 4 = 4’, instead an adult should say that ‘10 x 4 = 40’. Children can use the multiplication fact 1 x 4 = 4 to support them when calculating 10 x 4 = 40, but they must not refer to the ‘1’ in ‘15’ as one. It must be referred to as ten. Please see the year 3 addition page for guidance on adding the by-products of the expanded column method. Multiplication features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

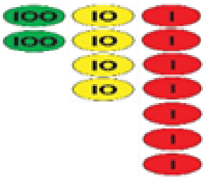
Concrete	Pictorial	Abstract
To begin with, children should select the correct number of objects to represent numbers up to 100. These objects can vary but dienes blocks and place value counters are good objects to use. 14 =  Children can then progress onto using concrete objects to calculate multiplication statements. Children should investigate and discover, and an adult should emphasise, the distributive law at this stage of learning i.e. 14 x 8 = (10 x 8) + (4 x 8). Children should also investigate and discover how to multiply 1-digit numbers by 10 at this stage of learning i.e. 10 x 8 = 80. 14 x 8 = 112  10 x 8 = 80  4 x 8 = 32	Children will then be shown pictorial representations of multiplication statements and can draw their own. The more pictorial representations that children are exposed to the better. 12 x 6 = 72  An adult will then model how to use the expanded column method to calculate multiplication statements alongside concrete objects and pictorial representations. To begin with, these statements will require multiplying a 2-digit number (less than 20) by a 1-digit number. 14 x 5 = 70  $\begin{array}{rl} & 14 \\ \times & 5 \\ \hline & 20 \quad (5x4) \\ & 50 \quad (5x10) \\ \hline & 70 \\ \hline \end{array}$	Children can then progress onto using the expanded column method to calculate multiplication statements. To begin with, children should not progress beyond multiplying a 2-digit number (less than 20) by a 1-digit number. $\begin{array}{rl} & 16 \\ \times & 3 \\ \hline & 18 \quad (3x6) \\ & 30 \quad (3x10) \\ \hline & 48 \\ \hline \end{array}$ If understanding is good, children can then progress onto multiplying a 2-digit number (less than 30) by a 1-digit number. Children may be more comfortable multiplying a 1 digit number by 10 twice or they may be more comfortable multiplying a 1 digit number by 2 first and then multiplying it by 10. $\begin{array}{rl} & 23 \\ \times & 4 \\ \hline & 40 \quad (4x10) \\ & 40 \quad (4x10) \\ & 12 \quad (4x3) \\ \hline & 92 \\ \hline \end{array}$ $\begin{array}{rl} & 23 \\ \times & 4 \\ \hline & 80 \quad (4x20) \\ & 12 \quad (4x3) \\ \hline & 92 \\ \hline \end{array}$ Children should remain on calculating statements that require multiplying a 2-digit number (less than 30) by a 1-digit number at this stage of learning. Children should also remain on the expanded column method at this stage of learning. Multiplication features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

Year 4 Multiplication

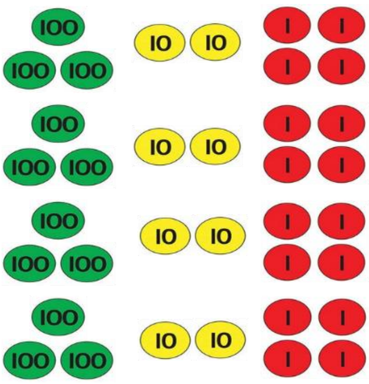
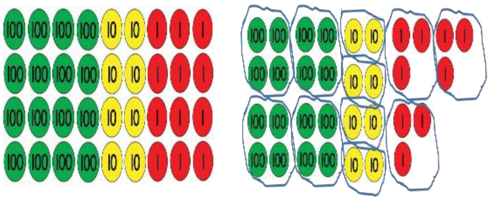
Attainment Targets:

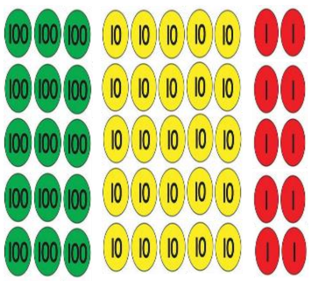
- Count in multiples of 2, 3, 5, 10, 4, 8, 6, 7, 9, 11 and 12 from 0
- Recall multiplication facts for multiplication tables up to 12 × 12
- Use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1; multiplying together three numbers
- Recognise and use factor pairs and commutativity in mental calculations
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

Counting in multiples of 2, 3, 5, 10, 4, 8, 6, 7, 9, 11 and 12 from 0 is a key skill at this stage of learning that will allow future success in mathematics. Children should also be able to recall and use many multiplication facts up to 12x12 at this stage of learning. Accurate use of terminology with the ongoing use of the expanded column method is essential if children are going to continue to secure a good understanding of place value. In the example in the pictorial section below, the ‘3’ in 352 is not worth 3 it is worth ‘300’. An adult must not say ‘5x3=15’, instead an adult must say that ‘5x300=1,500’. Children can use the calculation 5x3=15 to support them in calculating 5x300=1,500, but they must not refer to the ‘3’ in ‘352’ as three. Please see the year 4 addition page for guidance on adding the by-products of the expanded column method. Multiplication features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

<table>
<tr><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>To begin with, children should select the correct number of objects to represent numbers up to 1,000. At this stage of learning, place value counters are the most suitable objects to use as numbers are larger.
237 = 

Children can then progress onto using concrete objects to calculate multiplication statements. Children should not progress beyond multiplying a 2 or 3-digit number by a 1-digit number at this stage of learning.

324 x 4 = 1,296
</td>
<td>Children will then be shown pictorial representations of multiplication statements and can draw their own. The more pictorial representations that children are exposed to the better.
423 x 4 = 1,692


An adult will then model how to use the expanded column method to calculate multiplication statements alongside concrete objects and pictorial representations. An adult should emphasise at this stage of learning that children should draw on known multiplication facts to support their calculations i.e. 5x3=15 therefore 5x300=1,500, 5x5=25 therefore 5x50=250.

352
x 5
10
250
1,500
1,760</td>
<td>Children can then progress onto using the expanded column method to calculate multiplication statements. To begin with, children should not progress beyond multiplying a 2 or 3-digit number by a 1-digit number.
67
x 6
42
360
402
1

267
x 6
42
360
1,200
1,602
1

If understanding is good, children can then progress onto multiplying two 2-digit numbers together. An adult should emphasise at this stage that children should draw upon known multiplication facts to support their calculations i.e. 2x3=6 therefore 20x30=600
32
x 23
6
90
40
600
736
1

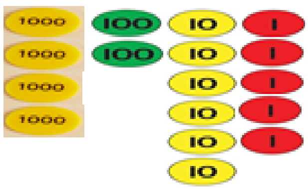
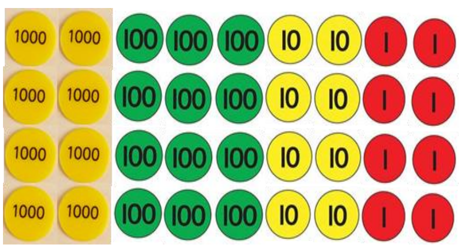
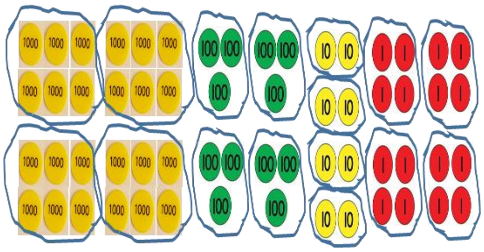
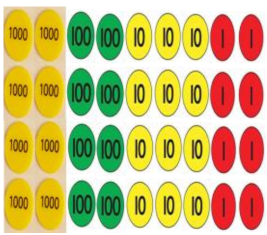
Children should not progress beyond multiplying a 2 or 3-digit number by a 1-digit number or multiplying two 2-digit numbers together at the stage of learning. Children should remain on the expanded column method at this stage of learning. Multiplication features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.</td>
</tr>
</table>

Year 5 Multiplication

Attainment Targets:

- Count in multiples of 2, 3, 5, 10, 4, 8, 6, 7, 9, 11 and 12 from 0
- Recall multiplication and division facts for multiplication tables up to 12 × 12
- Identify multiples and factors, including finding factor pairs of a number and common factors of 2 numbers
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Multiply numbers up to 4 digits by a one-or two-digit number using a formal written method, including long multiplication for two-digit numbers
- Multiply numbers mentally drawing upon known facts
- Multiply whole numbers and those involving decimals by 10, 100 and 1000

Being able to recall and use many multiplication facts up to 12x12 is a key skill at this stage of learning that will allow future success in mathematics. Children will continue to use the expanded column method at this stage of learning. Accurate use of terminology with the ongoing use of the expanded column method, and the introduction of the compact column method if children's understanding of multiplication is secure, is essential if children are going to continue to secure a good understanding of place value. In the example in the pictorial section below, the '2' in 2,232 is not worth 2 it is worth '2,000'. An adult must not say '4x2=8', instead an adult must say that '4x2,000=8,000'. Children can use the calculation 4x2=8 to support them in calculating 4x2,000=8,000, but they must not refer to the '2' in '2,232' as two. Please see the year 5 addition page for guidance on adding the by-products of the expanded column method. Multiplication features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

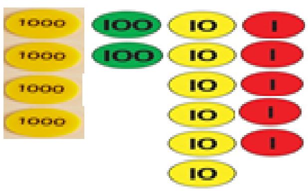
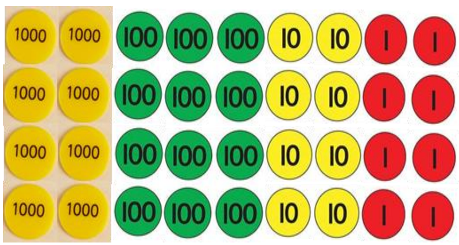
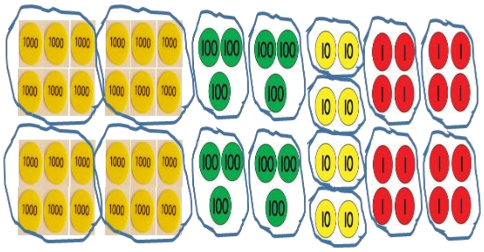
Concrete	Pictorial	Abstract
To begin with, children should select the correct number of objects to represent 4-digit numbers. At this stage of learning, place value counters are the most suitable objects to use as numbers are larger. 4,265 =  Children can then progress onto using concrete objects to calculate multiplication statements. Children should not progress beyond multiplying a 2, 3 or 4-digit number by a 1-digit number at this stage of learning. 2,322 x 4 = 9,288 	Children will then be shown pictorial representations of multiplication statements and can draw their own. The more pictorial representations that children are exposed to the better. 6,324 x 4 = 25,296  An adult will then model how to use the expanded column method to calculate multiplication statements alongside concrete objects and pictorial representations. An adult should emphasise at this stage of learning that children should draw on known multiplication facts to support their calculations i.e. 4x2=8 therefore 4x2,000=8,000, 4x3=12 therefore 4x30=120.  2,232 x 4 8 120 800 8,000 8,928	Children can then progress onto using the expanded column method to calculate multiplication statements. To begin with, children should not progress beyond multiplying a 2, 3 or 4-digit number by a 1-digit number. 267 x 6 42 360 1,200 1,602 1 3,433 x 5 15 150 2,000 15,000 17,165 If understanding is good, children can then be introduced to and use the compact method to calculate multiplication statements and can progress onto multiplying a 2 or 3-digit number by a 2-digit number. An adult should emphasise at this stage that children should draw upon known multiplication facts to support their calculations i.e. 2x3=6 therefore 20x300=6,000. Children should also progress onto multiplying numbers with 1 decimal place at this stage of learning. 2 2 356 x 24 3560 3560 1424 8544 1 1 Children should not progress beyond multiplying a 2, 3 or 4-digit number by a 1-digit number or multiplying a 2 or 3-digit number by a 2-digit number at this stage of learning. Children should remain on the expanded column method at this stage of learning.

Year 6 Multiplication

Attainment Targets:

- Count in multiples of 2, 3, 5, 10, 4, 8, 6, 7, 9, 11 and 12 from 0
- Recall multiplication and division facts for multiplication tables up to 12 × 12
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Perform mental calculations, including with mixed operations and large numbers
- Identify common factors, common multiples and prime numbers
- Use their knowledge of the order of operations to carry out calculations involving the four operations
- Solve problems involving addition, subtraction, multiplication and division
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Being able to recall and use multiplication facts up to 12x12 is a key skill at this stage of learning that will allow future success in mathematics. Children will be introduced to the compact column method at this stage of learning and they can choose which method of multiplication they feel most comfortable using. Accurate use of terminology is essential if children are going to continue to secure a good understanding of place value. In the example in the pictorial section below, the '3' in 3,356 is not worth 3 it is worth '3,000'. An adult must not say '4x3=12', instead an adult must say that '4x3,000=12,000'. Children can use the calculation 4x3=12 to support them in calculating 4x3,000=12,000, but they must not refer to the '3' in '3,356' as three. Please see the year 6 addition page for guidance on adding the by-products of the column methods. Multiplication features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

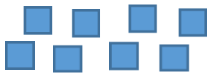
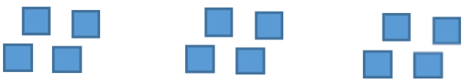
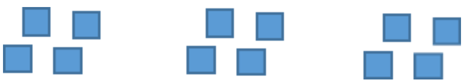
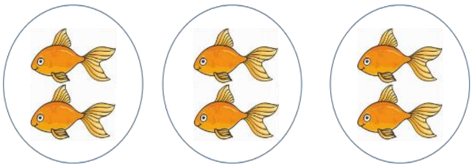
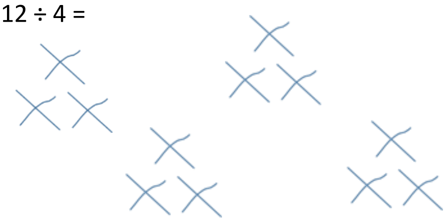
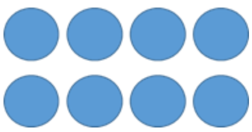
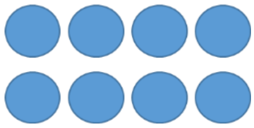
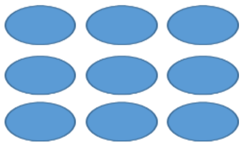
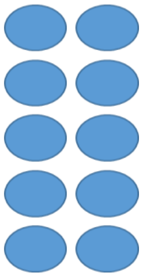
Concrete	Pictorial	Abstract
To begin with, children should select the correct number of objects to represent 4-digit numbers. At this stage of learning, place value counters are the most suitable objects to use as numbers are larger. 4,265 =  Children can then progress onto using concrete objects to calculate multiplication statements. Children should not progress beyond multiplying a 2, 3 or 4-digit number by a 1-digit number at this stage of learning. 2,322 x 4 = 9,288 	Children will then be shown pictorial representations of multiplication statements and can draw their own. The more pictorial representations that children are exposed to the better. 6,324 x 4 = 25,296  An adult will then model how to use the expanded column method and the compact column method to calculate multiplication statements. An adult should emphasise at this stage of learning that children should draw on known multiplication facts to support their calculations i.e. 4x3=12 therefore 4x3,000=12,000. 3,356 x 4 24 200 1,200 12,000 13,424 3,356 x 4 13,424 1 2 2	Children can then progress onto using the expanded or compact method to calculate multiplication statements (example of compact method below). If multiplying by a small multiple of 10, children should be encouraged to multiply the 4-digit number by 10 once or twice to speed up the calculation (see example below). 2 2 2 3,678 x 23 36,780 36,780 11,034 84,594 1 1 1 If understanding is good, children should then progress onto multiplying 4-digit numbers by 2-digit numbers larger than 30. This will require children to use formal written methods of long multiplication. The use of jottings alongside the calculation to support children can be encouraged (see example below). 2 2 2 3,678 X 5 6 6 83 11,034 294,240 305,274 1 8 x 8 = 64 80 x 8 = 640 8 x 7 = 56 80 x 70 = 560 8 x 6 = 48 80 x 600 = 48,000 8 x 3 = 24 80 x 3,000 = 240,000 Alternatively, chn can be encouraged to use the distributive law when multiplying 4-digit numbers by 2-digit numbers larger than 30 i.e. 3,678 x 54 can be calculated by multiplying 3,678 by 27 and then multiplying the answer by 2 (27 x 2 = 54).

Year 1 Division

Attainment Targets:

- Solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- Count in multiples of 2's, 5's and 10's

Counting in multiples of 2, 5 and 10 from 0 is a key skill at this stage of learning that will allow future success in mathematics. Although children are only required to calculate division statements using concrete objects and pictorial representations at this stage of learning, calculating division statements using counting strategies can be encouraged at this stage of learning (if children have demonstrated that they can accurately calculate division statements using concrete objects and pictorial representations initially). Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of division targets in every year group is fundamental to future success in mathematics.

Concrete	Pictorial	Abstract
To begin with, children should select the correct number of objects to represent numbers up to 20. The objects that are used can vary but dienes blocks and place value counters are good objects to use. 8  Children can then progress onto selecting the correct number of objects and sharing them into a specified number of groups. To begin with, this task should be completed verbally and practically without the '÷' symbol.  *Adult: Can you select 12 ones?* *Child attempts and adult supports* *Adult: Can you share them into 3 equal piles?* This can then progress onto an adult displaying the division symbol alongside the objects. The adult should explain at this stage that the '÷' symbol means shared/split into. 12 ÷ 3 =  *Adult: The '÷' symbol means shared/split into* *Adult: Share 12 ones into 3 equal piles.* *Child attempts and adult supports* Children can then attempt to accurately share objects to represent other division statements. Children should remain on dividing numbers up to 20 by a 1-digit number at this stage of learning i.e. 10 ÷ 5 = 2.	Children can then be shown pictorial representations alongside division statements. The more pictorial representations that children are exposed to the better. 6 ÷ 3 =  This can then progress onto children drawing their own representations of division statements i.e. children could draw groups of dots or crosses onto whiteboards to visually represent division statements. 12 ÷ 4 =  An adult can then model how to arrange objects into arrays to represent division statements. An adult should emphasise at this stage that children are still solving division statements and that the '÷' symbol still means the same thing. The only difference is that we are now arranging the objects into 'neat rows called arrays'. 8 ÷ 2 = 4  This makes the objects easier to count and at a later stage of maths will support children in beginning to use counting strategies to solve division statements.	Children can then progress onto arranging objects into arrays with adult support to calculate division statements. 8 ÷ 2 = 4  Children can then progress onto arranging objects into arrays to calculate division statements independently. 9 ÷ 3 = 3  If understanding is good, children can use counting strategies when calculating division statements within the 2 and 5 times tables alongside arrays. Children are taught to count in multiples of 2 and 5 at this stage of learning. 10 ÷ 5 = 2  *Adult: How many groups did you need to share the objects into?* *Child answers and adult supports.* *Adult: Could you count in multiples of 5 and stop when you reach 10 instead?* *Child attempts and adult supports.* Children should only divide numbers up to 20 by a single digit number at this stage of learning to ensure that they develop a secure understanding of early division. Division features frequently on statutory assessments in years 2 and 6.

Year 2 Division

Attainment Targets:

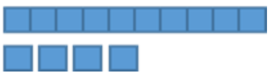
- Count in multiples of 2, 3, 5 and 10 from 0
- Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs
- Show that division of one number by another cannot be done in any order
- Solve problems involving division using materials, arrays, repeated addition, mental methods, and division facts, including problems in contexts
- Recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

Counting in multiples of 2, 3, 5 and 10 from 0 is a key skill at this stage of learning that will allow future success in mathematics. Showing children that division is not commutative and cannot be done in any order, through the use of concrete objects, is another key skill at this stage of learning that will allow future success in mathematics. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of division targets in every year group is essential.

Concrete

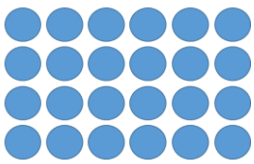
To begin with, children should select the correct number of objects to represent numbers up to 50. These objects can vary but dienes blocks and place value counters are good objects to use.

14 =



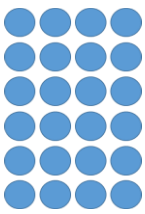
Children can then progress onto using concrete objects arranged into arrays to calculate division statements. An adult should emphasise that whether children share their objects into a specified number of groups, or group their objects into a specified number they will receive the correct answer.

24 ÷ 6 = 4



Shared into 6 piles.

24 ÷ 6 = 4



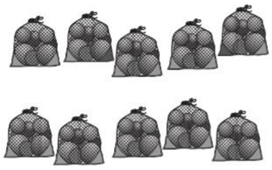
Grouped into sixes.

Children can then attempt to accurately share objects to represent other division statements. Children should remain on dividing numbers up to 50 by a 1-digit number at this stage of learning.

Pictorial

Children will then be shown pictorial representations of division statements. The more representations that children are exposed to the better.

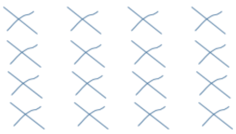
100 balls are shared equally into 10 bags.



10 balls are inside each bag.

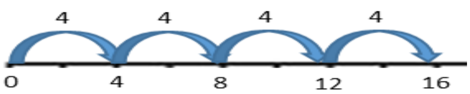
Children can then progress onto drawing their own pictorial representations of division statements. Children will be exposed to pictorial representations of division statements that are not arranged into rows/arrays during their learning. Therefore, children do not always have to draw their representations into arrays.

16 ÷ 4 = 4



An adult will then model how to use a number line to calculate division statements alongside concrete and pictorial representations. An adult should emphasise at this stage of learning that repeated addition can be used to calculate division statements.

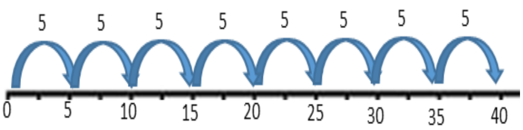
16 ÷ 4 = 4



Abstract

Children can then progress onto using number lines to calculate division statements through repeated addition. An adult should emphasise at this stage of learning that division is not commutative and cannot be done in any order.

40 ÷ 5 = 8



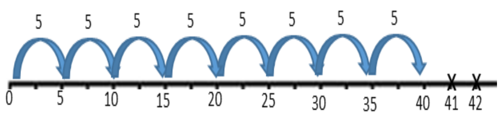
If understanding is good, children can progress onto using counting strategies and mental methods to calculate division statements within the 2, 3, 5 and 10 multiplication tables. Children are taught to count in these multiples at this stage of learning.

25 ÷ 5 = 5

The child can record this division statement straight away without the use of a number line if they are confident to do so. They can count in 5's and stop when they reach 25 or re-call/remember this multiplication fact.

If children secure a good understanding of division they can progress onto calculating division statements with remainders.

42 ÷ 5 = 8r2



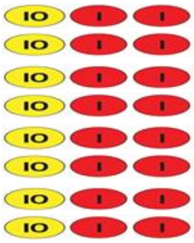
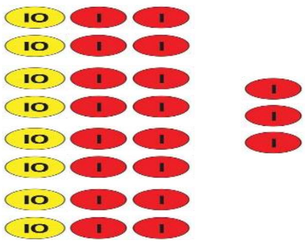
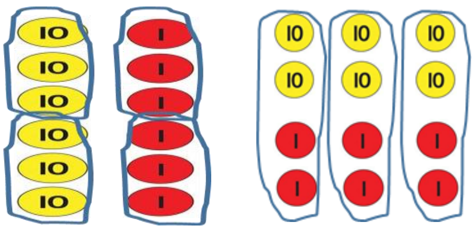
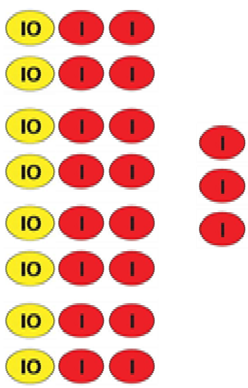
Children should only divide a 1 or 2-digit number by a 1-digit number at this stage of learning. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

Year 3 Division

Attainment Targets:

- Count in multiples of 2, 3, 5, 10, 4 and 8 from 0
- Recall and use division facts for the 2, 3, 4, 5, 8 and 10 multiplication tables
- Write and calculate mathematical statements for division using the multiplication tables that they know, using mental and progressing to formal written methods
- Solve problems involving division, including missing number problems, positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Counting in multiples of 2, 3, 5, 10, 4 and 8 from 0 is a key skill at this stage of learning that will allow future success in mathematics. Children are introduced to long division at this stage of learning, please see the year 3 subtraction page for guidance on subtracting the by-products of long division. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of division targets in every year group is essential.

Concrete	Pictorial	Abstract
To begin with, children should select the correct number of objects to represent numbers up to 3 digits. These objects can vary but dienes blocks and place value counters are good objects to use. 237 =  Children can then progress onto using concrete objects to calculate division statements. 96 ÷ 8 = 12  Children can then progress onto calculating division statements that contain remainders. 99 ÷ 8 = 12r3 	Children will then be shown pictorial representations of division statements and can draw their own. The more pictorial representations that children are exposed to the better. 66 ÷ 3 = 22  An adult will then model how to use long division methods to calculate division statements alongside concrete objects and pictorial representations. To begin with, these statements will require dividing a 2-digit number by a 1-digit number. These questions can contain remainders.  12r3 8)99 80 (10) 19 16 (2) 3	Children can then progress onto using long division methods to calculate division statements. To begin with, children should not progress beyond dividing a 2-digit number by a 1-digit number. 14 7)98 70 (10) 28 28 (4) 0 If understanding is good, children can then progress onto dividing a 2 or 3-digit number by a 1 digit number. Children may be more comfortable multiplying a 1-digit number by 10 or they may be more comfortable multiplying the number by other powers of 10. 124r4 6)748 600 (100) 148 120 (20) 28 24 (4) 4 Children should remain on calculating statements that require dividing a 2 or 3-digit number by a 1-digit number at this stage of learning. Children should also remain on using long division methods at this stage of learning. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of division targets in every year group is essential.

Year 4 Division

Attainment Targets:

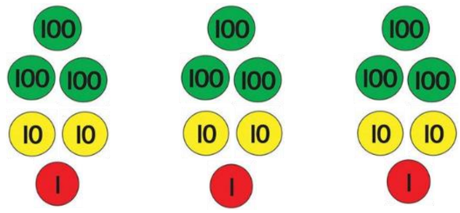
- Count in multiples of 2, 3, 5, 10, 4, 8, 6, 7, 9, 11 and 12 from 0
- Recall and use division facts for multiplication tables up to 12 × 12
- Use place value, known and derived facts to divide mentally, including dividing by 1
- Recognise and use factor pairs in mental calculations

Counting in multiples of 2, 3, 5, 10, 4, 8, 6, 7, 9, 11 and 12 from 0 is a key skill at this stage of learning that will allow future success in mathematics. Children should also be able to recall and use many multiplication facts up to 12x12 at this stage of learning. Children continue to use long division methods at this stage of learning. Please refer to guidance on the year 4 subtraction page for subtracting the by-products of long division. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of division targets in every year group is essential.

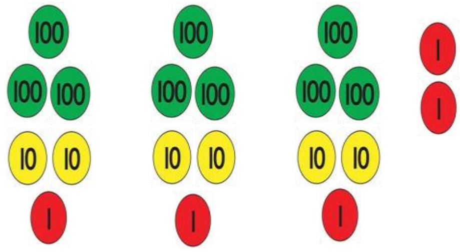
<table>
<tr><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>
To begin with, children should select the correct number of objects to represent numbers up to 3 digits. These objects can vary but dienes blocks and place value counters are good objects to use.

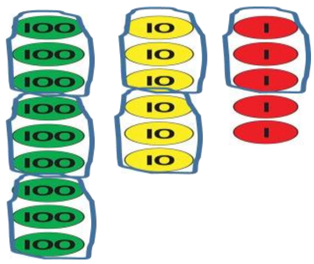
237 =

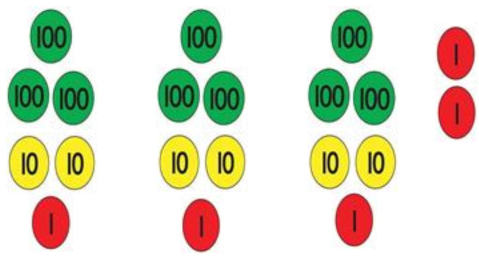

Children can then progress onto using concrete objects to calculate division statements.

963 ÷ 3 = 321


Children can then progress onto calculating division statements that contain remainders.

965 ÷ 3 = 321r2


</td>
<td>
Children will then be shown pictorial representations of division statements and can draw their own. The more pictorial representations that children are exposed to the better.
965 ÷ 3 = 321r2


An adult will then model how to use long division methods to calculate division statements alongside concrete objects and pictorial representations. To begin with, these statements will require dividing a 3-digit number by a 1-digit number and can contain remainders.


321r2
3 | 965
300 (100)
665
300 (100)
365
300 (100)
65
63 (21)
2
</td>
<td>
Children can then progress onto using long division methods to calculate division statements. To begin with, children should not progress beyond dividing a 2 or 3-digit number by a 1-digit number.

120r5
7 | 845
700 (100)
145
140 (20)
5

If understanding is good, children can then progress onto dividing a 2 or 3-digit number by a 1 or 2-digit number. Children may be more comfortable multiplying a 1 or 2-digit number by 10 or 100 to begin with or they may feel more comfortable multiplying the number by different powers of 10.

46r17
18 | 845
360 (20)
485
360 (20)
125
90 (5)
35
18 (1)
17

Children should remain on calculating statements that require dividing a 2 or 3-digit number by a 1 or 2-digit number at this stage of learning. Children should also remain on using long division methods at this stage of learning. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of division targets in every year group is essential.
</td>
</tr>
</table>

Year 5 Division

Attainment Targets:

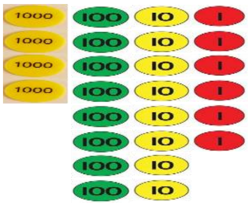
- Count in multiples of 2, 3, 5, 10, 4, 8, 6, 7, 9, 11 and 12 from 0
- Recall and use division facts for multiplication tables up to 12 × 12
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Divide numbers mentally drawing upon known facts
- 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
- Divide whole numbers and those involving decimals by 10, 100 and 1000

Being able to recall and use many multiplication facts up to 12x12 is a key skill at this stage of learning that will allow future success in mathematics. Children will continue to use long division methods at this stage of learning and can be introduced to short division methods if their understanding of division is secure. Please refer to guidance on the year 5 subtraction page for subtracting the by-products of long division. Accurate use of terminology, if short division methods are introduced at this stage of learning, is essential if children are going to continue to secure a good understanding of place value. In the example in abstract section below, the '27' in '2764' is worth 2,700, it is not worth 27. An adult must not say that 9 goes into 27 three times, instead they must say that 'if 9 goes into 27 three times, it goes into 2700 nine hundred times'. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

Concrete

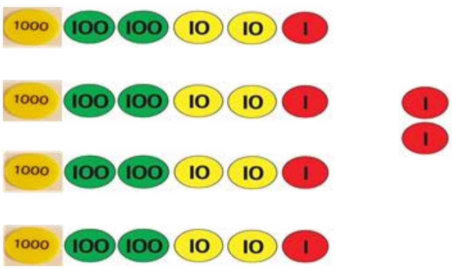
To begin with, children should select the correct number of objects to represent numbers up to 4 digits. Place value counters are good objects to use at this stage of learning as numbers are larger.

4,886 =



Children can then progress onto using concrete objects to calculate division statements. These statements can contain remainders.

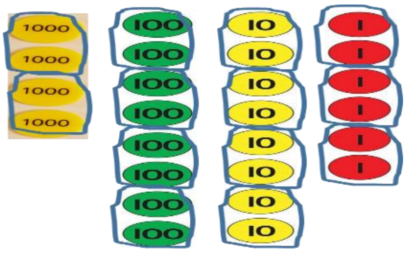
4,886 ÷ 4 = 1,221r2



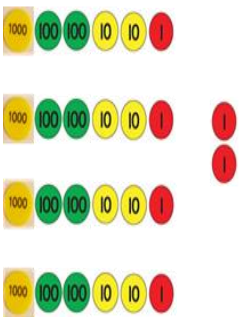
Pictorial

Children will then be shown pictorial representations of division statements and can draw their own. The more pictorial representations that children are exposed to the better.

4,886 ÷ 2 = 2,443



An adult will then model how to use long division methods to calculate division statements alongside concrete objects and pictorial representations. To begin with, these statements will require dividing a 4-digit number by a 1-digit number and can contain remainders.



```
   1221r2
4 |4886
   4000 (1000)
    886
    800 (200)
     86
     80 (20)
      6
      4 (1)
      2
```

Abstract

Children can then progress onto using long division methods to calculate division statements. To begin with, children should not progress beyond dividing a 2, 3 or 4-digit number by a 1-digit number or dividing a 2 or 3-digit number by a 2-digit number.

```
    153r2
24 |3674
    2400 (100)
    1274
    1200 (50)
      74
      72 (3)
       2
```

If understanding is good, children can then be introduced to short division methods when dividing by a 1-digit number. An adult should emphasise at this stage that children should draw upon known division facts to support their calculations i.e. 27÷9=3, therefore 2,700÷900=300.

```
  300
9|2700
```

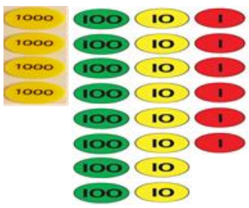
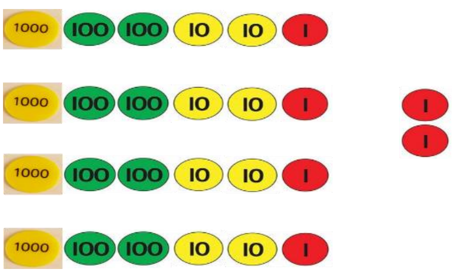
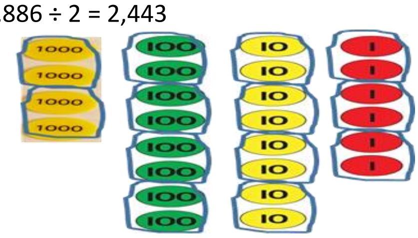
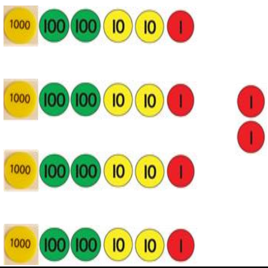
Children should remain on calculating statements that require dividing a 2, 3 or 4-digit number by a 1-digit number or statements that require dividing a 2 or 3-digit number by a 2-digit number at this stage of learning. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of division targets in every year group is essential.

Year 6 Division

Attainment Targets:

- Count in multiples of 2, 3, 5, 10, 4, 8, 6, 7, 9, 11 and 12 from 0
- Recall and use division facts for multiplication tables up to 12 × 12
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- Perform mental calculations, including with mixed operations and large numbers
- Identify common factors, common multiples and prime numbers
- Use their knowledge of the order of operations to carry out calculations involving the four operations
- Solve problems involving addition, subtraction, multiplication and division
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Being able to recall and use many multiplication facts up to 12x12 is a key skill at this stage of learning that will allow future success in mathematics. Children will continue to use long division methods at this stage of learning and will be introduced to short division methods. Please refer to guidance on the year 6 subtraction page for subtracting the by-products of long division. Accurate use of terminology, if short division methods are introduced at this stage of learning, is essential if children are going to continue to secure a good understanding of place value. In the example in abstract section below, the ‘36’ in ‘3679’ is worth 3,600, it is not worth 36. An adult must not say that 6 goes into 36 six times, instead they must say that ‘if 6 goes into 36 six times, it goes into 3600 six hundred times’. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of multiplication targets in every year group is essential.

Concrete	Pictorial	Abstract
To begin with, children should select the correct number of objects to represent numbers up to 4 digits. Place value counters are good objects to use at this stage of learning as numbers are larger. 4,886 =  Children can then progress onto using concrete objects to calculate division statements. These statements can contain remainders. 4,886 ÷ 4 = 1,221r2 	Children will then be shown pictorial representations of division statements and can draw their own. The more pictorial representations that children are exposed to the better. 4,886 ÷ 2 = 2,443  An adult will then model how to use long and short division methods to calculate division statements alongside concrete objects and pictorial representations. These statements will require dividing a 4-digit number by a 1-digit number and can contain remainders.  1221r2 4 | 4886	Children can then progress onto using long or short division methods to calculate division statements. Children will calculate statements that require dividing a 2, 3 or 4-digit number by a 1 or 2-digit number. To begin with, children will be guided on which method is the most appropriate to use for each question. 234r16 24 | 5632 4800 (200) 832 720 (30) 112 96 (4) 16 613r1 6 | 3^{1}679 If understanding is good, children will then be encouraged to select which method they feel more comfortable using based on the question they are calculating. It is more likely that short division will be more appropriate when dividing by a 1-digit number and long division will be more appropriate when dividing by a 2-digit number. Division features frequently on statutory assessments in years 2 and 6, securing a good understanding of division targets in every year group is essential.