Greenleaf Primary School

Calculations Policy

Updated May 2026

This policy uses elements, including images, from the White Rose Maths calculation policy and guidance.

Mathematics at Greenleaf

Our Calculation Policy is underpinned by the **UN Convention on the Rights of the Child**. In line with *Article 28 (Right to Education)*, we provide all pupils with access to a consistent, high-quality approach to learning calculation. Through *Article 29 (Goals of Education)*, we support pupils in developing mathematical fluency, reasoning and problem-solving skills to their fullest potential. We value pupils' mathematical thinking and encourage them to explain and discuss different strategies, reflecting *Article 12 (Respect for the Views of the Child)*. The policy also promotes inclusion and equality through *Articles 2 and 23*, ensuring that all pupils, including those with additional needs, can access and succeed in mathematics.

At Greenleaf, our mathematics curriculum is designed in line with the principles of teaching for mastery, as advocated by the NCETM and reflected in White Rose Maths. We aim to develop confident, fluent and resilient learners who have a deep and connected understanding of mathematical concepts. Content is broken down into small, coherent steps and taught through a carefully sequenced curriculum, allowing all pupils to make progress together. Key concepts are revisited and built upon over time to ensure depth of understanding.

Teaching follows the CPA (Concrete–Pictorial–Abstract) approach, enabling pupils to explore mathematical structures through concrete resources and visual representations before moving to abstract methods and notation. A strong emphasis is placed on fluency, with pupils developing secure recall of key facts alongside flexibility in their application. Variation is used to draw attention to key mathematical structures, and pupils are given opportunities to reason, explain and make connections using precise mathematical language.

All pupils are taught through inclusive, mixed-attainment teaching, where high expectations are maintained and all learners are supported to succeed. Carefully designed tasks, alongside strategies such as live modelling, guided practice and ongoing formative assessment, are used to identify and address misconceptions. Pupils are encouraged to think mathematically, justify their reasoning and develop independence in selecting efficient strategies.

Concrete resources and key representations are used consistently across the school to support understanding of calculation. These include, but are not limited to, base ten equipment, place value counters, number lines, arrays and bar models. Representations are chosen to expose mathematical structure and support generalisation. As pupils progress, they move fluently between representations and increasingly use formal written methods with understanding.

This calculation policy outlines the progression of methods for the four operations from Year 1 to Year 6. It ensures a coherent and consistent approach to calculation across the school, supporting smooth transition between year groups. The policy also identifies key mental strategies that underpin pupils' fluency and enable them to calculate efficiently and accurately.

We recognise the importance of working in partnership with parents and carers to support pupils' mathematical development. Each year, from Reception to Year 6, classes provide opportunities for parents to attend maths workshops where they work alongside their children. These sessions support parents in understanding the methods, representations and strategies used in school, enabling them to provide consistent and effective support at home while building confidence in mathematics.

Progression of skills in calculations at a glance

	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition	• Subitise to 3 • Count how many • Make numbers to 5 • Add 1 more (through songs and rhymes)	• Conceptually subitise to 5 • 1 more • Notice the composition of numbers within 10 • Combine 2 groups • Add more	• Add together • Add more • Bonds within 10 • Related facts within 20 • Missing numbers	• Add 1s to any number (related facts) • Add three 1-digit numbers • Add across a 10 Add multiples of 10 • Add 10s to any number • Add two 2-digit numbers (not across a ten) • Add two 2-digit numbers (across a ten) • Missing numbers	• Add 1s, 10s and 100s to a 3-digit number • Add two numbers (no exchange) • Add two numbers across a 10 or 100 • Complements to 100 • Add fractions with the same denominator within 1 whole • Calculate the duration of events	• Add 1s, 10s and 100s to a 4-digit number • Add up to two 4-digit numbers • Add decimal numbers in the context of money • Add fractions and mixed numbers with the same denominator beyond 1 whole	• Add using mental strategies • Add whole numbers with more than 4 digits • Add decimals with up to 2 decimal places • Complements to 1 • Add fractions with denominators that are a multiple of one another	• Add integers up to 10 million • Add decimals with up to 3 decimal places • Order of operations • Negative numbers • Add fractions
Subtraction	• Subitise to 3 • Count how many Make numbers to 5 • Take 1 away (through songs and rhymes)	• Conceptually subitise to 5 • 1 less • Notice the composition of numbers within 10 • Partition • Take away •	• Find a part • Take away • Bonds within 10 • Related facts within 20 • Missing numbers	• Subtract 1s from any number (related facts) • Subtract across a 10 • Subtract multiples of 10 • Subtract 10s from any number • Subtract two 2-digit numbers (not across a ten) • Subtract two 2-digit numbers (across a ten) • Missing numbers	• Subtract 1s, 10s and 100s from a 3-digit number • Subtract two numbers (no exchange) • Subtract two numbers across a 10 or 100 • Complements to 100 • Subtract fractions with the same denominator within 1 whole	• Subtract 1s, 10s, 100s and 1,000s from a 4-digit number • Subtract up to two 4-digit numbers • Subtract decimal numbers in the context of money • Subtract fractions and mixed numbers with the same denominator	• Subtract whole numbers with more than 4 digits • Subtract using mental strategies Subtract decimals with up to 2 decimal places Complements to 1 • Subtract fractions with denominators that are a multiple of one another	• Subtract integers up to 10 million • Subtract decimals with up to 3 decimal places • Order of operations • Negative numbers • Subtract fractions

Multiplication	• Continue with counting and subitising skills as a foundation for later work on equal groups. (see addition and subtraction sections)	• Double to 10 • Make equal groups	• Count in 2s, 5s and 10s • Add equal groups • Make arrays • Make doubles	• Link repeated addition and multiplication • Use arrays • Double • The 2 times-table • The 10 times-table The 5 times-table • Missing numbers	• The 3 times-table • The 4 times-table The 8 times-table Related facts • Multiply a 2-digit number by a 1-digit number - no exchange • Multiply a 2-digit number by a 1-digit number - with exchange • Scaling • Correspondence problems	• Times-table facts to 12 × 12 • Multiply by 1 and 0 • Multiply 3 numbers • Factor pairs • Multiply by 10 and 100 • Related facts • Mental strategies • Multiply a 2 or 3-digit number by a 1-digit number • Scaling Correspondence problems	• Multiples and factors • Square and cube numbers • Multiply numbers up to 4 digits by a 1-digit number • Multiply numbers up to 4 digits by a 2-digit number • Multiply by 10, 100 and 1,000 • Mental strategies Multiply fractions by a whole number • Multiply mixed numbers by a whole number • Find the whole	• Multiply numbers up to 4 digits by a 2-digit number • Multiply by 10, 100 and 1,000 • Order of operations • Multiply decimals by integers • Multiply fractions by fractions • Find the whole • Calculations involving ratio
Division	• Continue with counting and subitising skills as a foundation for later work on equal groups. (see addition and subtraction sections)	• Sharing • Grouping	• Make equal groups – grouping • Make equal groups – sharing • Find a half • Find a quarter	• Divide by 2 • Divide by 10 • Divide by 5 • Missing numbers • Unit fractions • Non-unit fractions	• Divide by 3 • Divide by 4 • Divide by 8 • Related facts • Divide a 2-digit number by a 1-digit number - no exchange • Divide a 2-digit number by a 1-digit number - with remainders • Unit fractions of a set of objects • Non-unit fractions of a set of objects	• Division facts to 12 × 12 • Divide a number by 1 and itself • Related facts • Divide a 2 or 3-digit number by a 1-digit number • Divide by 10 and 100	• Mental strategies • Divide numbers up to 4 digits by a 1-digit number • Divide by 10, 100 and 1,000 • Fraction of an amount	• Short division • Mental strategies • Long division • Order of operations • Divide by 10, 100 and 1,000 • Divide decimals by integers • Decimal and fraction equivalents • Divide a fraction by an integer • Fraction of an amount • Calculate percentages • Calculations involving ratio

Progression in Calculations: Addition

ADDITION - Nursery	
Objectives	Key Questions & Stem Sentences
• Begin to have an understanding of numbers to 5 • We recommend focusing on noticing and representing small quantities, perceptual subitising and counting	• How many do you see? • How many are there? • Count out … from a larger group. E.g. Collect 3 beanbags for a game. • Show me… • Begin to link numerals to quantities. • How many do I have now?

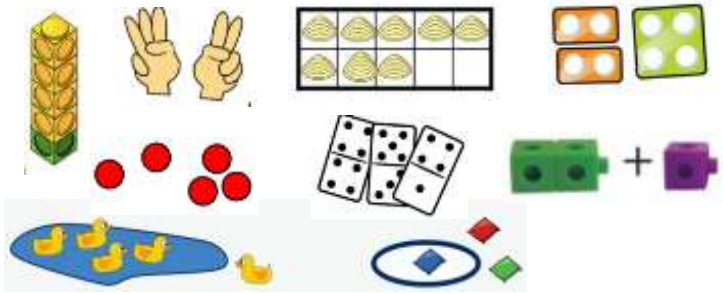
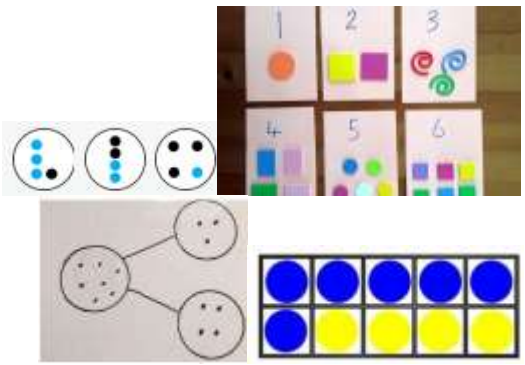
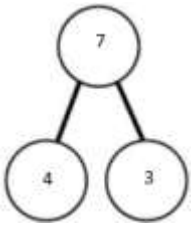
Key Representations

Instantly seeing how many.

Begin to count objects using 1-1 correspondence. Start by showing 1, 2 and 3 using fingers.

Adding 1 more through stories, songs and rhymes.

ADDITION - Reception	
Objectives	Key Questions & Stem Sentences
● Have a deep understanding of numbers to 10, including the composition of each number. ● Subitise (recognise quantities without counting) up to 5 ● Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts.	● What do you see? How do you see it? ● 1 more than … is … ● How many…? How many altogether? ● How many ways can you make…? ● There are …. There are …. Altogether. ● …. and …. make …. ● First… Then…. Now…. ● I have …. I add …. more. Now I have….

Concrete	Pictorial	Abstract
Combining two parts to make a whole using various resources (e.g. fingers, counters, dominoes, teddy bears, cubes, Numicon, five and ten frames…) 	Children draw images to represent concrete apparatus, such as dots, and complete pre-drawn ten frames and part whole models 	Children are supported by teachers to complete number sentences, with a continued focus on concrete materials. 

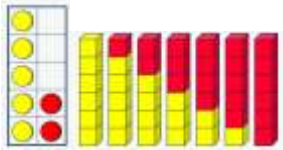
ADDITION - YEAR 1

Objectives	Key Questions & Stem Sentences
• Read, write and interpret mathematical statements involving addition (+) and equals (=) signs. • Represent and use number bonds within 20 • Add 1-digit and 2-digit numbers to 20, including zero. • Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as 7 = + 2	• … is a part. … is a part. … is the whole. • ... plus … is equal to … … is equal to …. + … • I start at … I jump on … I land on … • … is made of … and … … and … make … • … can be partitioned into … and … • I know that … and ... = … so … and … = ... • … more than … is … so … more than … is … • What patterns do you notice? • How many more do you need to make …? • If … is the whole and … is a part, the other part must be…

Concrete

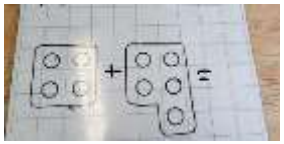
Combining two parts to make a whole using various resources e.g. eggs, shells, teddy bears, cars, Numicon, Dienes…)

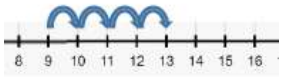
Related facts and missing numbers - practical making the numbers known



Pictorial

Children draw place value charts and manipulatives, indicating when they have exchanged. Exchange above the line.

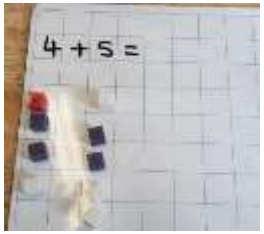


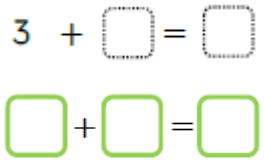


Related facts and missing numbers - drawing out the numbers known to find the missing value

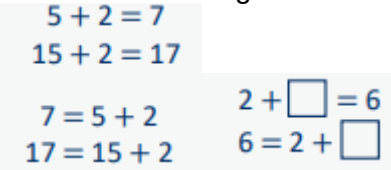
Abstract

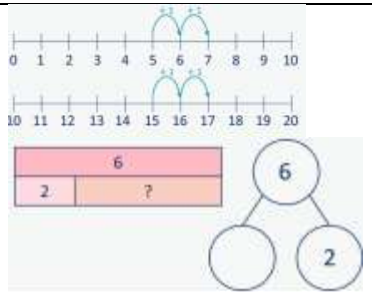
Children are supported by teachers to complete number sentences, with a continued focus on concrete materials.



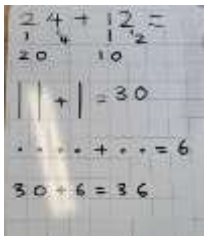


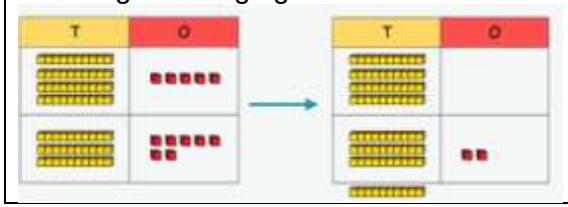
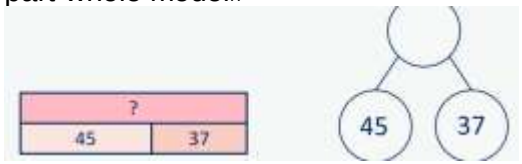
Writing out patterns noticed and how they worked out missing values.



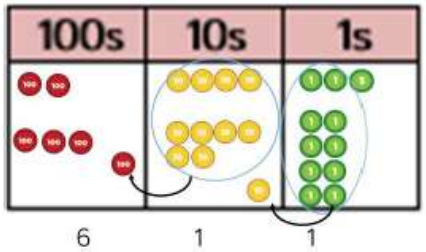
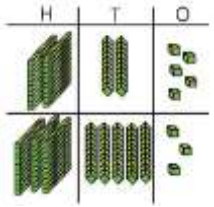
		

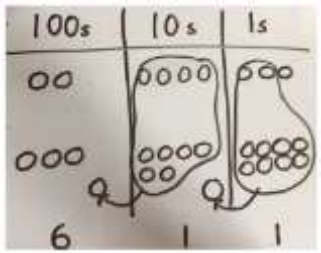
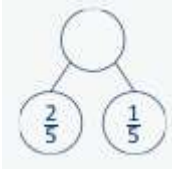
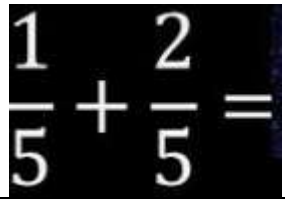
ADDITION - YEAR 2	
Objectives	Key Questions & Stem Sentences
● Recall and use addition facts to 20 fluently, and derive and use related facts up to 100 ● Add numbers using concrete objects, pictorial representations, and mentally, including: ○ a two-digit number and 1s ○ a two-digit number and 10s ○ 2 two-digit numbers ○ adding 3 one-digit numbers ● Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems	● What do you notice? Can you continue the pattern? ● … and … are a bond to 10 10 + … = … ● Double … + … = … ● What do you notice? Which addition is the easiest to calculate? ● I add … to get to … then I add … ● … ones + … ones = … ones so … tens + … tens = … tens ● What is the same? What is different? ● To add … I need to add 10 … times. ● There are …. ones, so I do/do not need to make an exchange ● How many more do you need to make …? ● If … is a whole and … is a part, then … is the other part.

Concrete	Pictorial	Abstract
Using dienes to show partitioning to add. 	Draw the dienes to show partitioning the add 	Show partitioning to add using written methods. Partition the number. Add the tens. Add the ones. Add the answer.

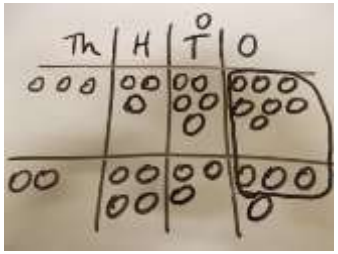
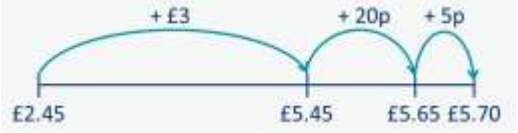
Showing exchanging 	Showing exchanging using a bar model or part-part-whole model# 	Writing out an exchange 5 ones + 7 ones = 12 ones 12 ones = 1 ten and 2 ones 4 tens + 3 tens + 1 ten = 8 tens 8 tens and 2 ones = 82

ADDITION - YEAR 3	
Objectives	Key Questions & Stem Sentences
● Add numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds. ● Add numbers with up to three digits, using formal written methods of columnar addition. ● Add fractions with the same denominator within 1 whole. ● Calculate the time taken by particular events or tasks.	● The ones/tens/hundreds column will increase by … ● What patterns do you notice? ● ... ones + … ones = … ones ... tens + … tens = … tens ... hundreds + … hundreds = … hundreds ● There are … ones, so I do/do not need to make an exchange. ● I add … to get to the next 10, then ... to get to 100 ● When adding fractions with the same denominator, I only add the numerator. … fifths + … fifths = … fifths ● From … to … o'clock is … minutes. From … o'clock to … is … minutes. The total time taken is … minutes.

Concrete	Pictorial	Abstract
Column method with regrouping, using place value charts with counters, base 10/ Dienes, Numicon.  	Children draw place value charts and manipulatives, indicating when they have exchanged. Exchange above the line.	Children use columnar addition to represent and solve the calculation. Exchange above the line. 1 1

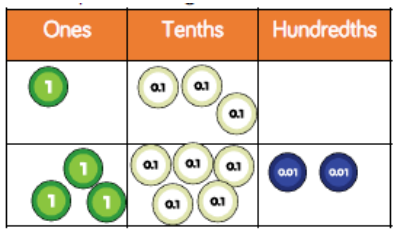
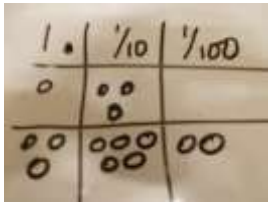
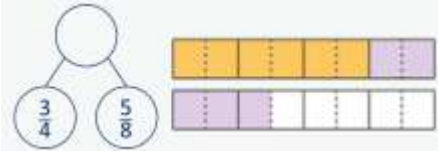
		243 +368 611
Making links with known fractions when looking at other objectives such as fractions 	Part part whole models to help calculate addition of fractions. 	Writing out the number sentence 

ADDITION - YEAR 4	
Objectives	Key Questions & Stem Sentences
● Add numbers with up to 4 digits using a formal written method. ● Solve simple measure and money problems involving fractions and decimals to 2 decimal places. ● Add fractions with the same denominator.	● The ones/tens/hundreds/thousands column will increase by … ● What patterns do you notice? ● There are … ones/tens/hundreds so I do/do not need to make an exchange. ● I can exchange 10 … for 1 … ● … pence + … pence = … pence … pounds + … pounds = … pounds ● £3.25 can be partitioned into £3 + 20p + 5p ● When adding fractions with the same denominator, I only add the numerator. … fifths + … fifths = … fifths

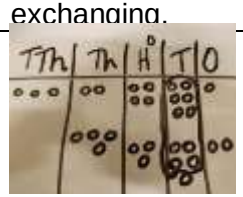
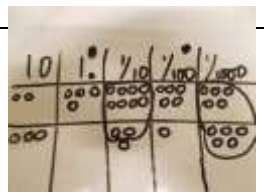
Concrete	Pictorial	Abstract
Column method with regrouping , using place value charts with counters (Th HTU) Partitioning to add hundreds/tens/ones separately 	Children draw place value charts and counters, indicating where they have exchanged. Exchange above the line.  Drawing number lines working above the line. Using partitioning to help support with the jumps.  	Children use columnar addition to represent and solve the calculation. Exchange above the line. 1 3,357 +2,434 5,791 Writing out the partitioned values then adding 45p + 25p = 70p £2 + £3 = £5 £5 + 70p = £5.70

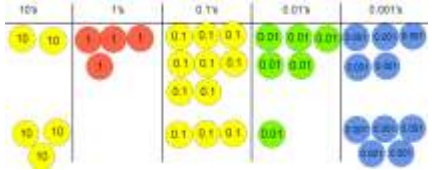
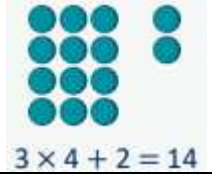
ADDITION - YEAR 5	
Objectives	Key Questions & Stem Sentences
• Add whole numbers with more than 4 digits, including using formal written methods. • Add numbers mentally with increasingly large numbers. • Add decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 • Add fractions with the same denominator, and denominators that are multiples of the same number.	• To add …, I can add … then subtract … • I can exchange 10 … for 1 … • I do/do not need to make an exchange because … • The denominator has been multiplied by …, so the numerator needs to be multiplied by… for the fractions to be equivalent. • Can this be done mentally? • Is there a more effective way of solving this problem?

Concrete	Pictorial	Abstract
Column method with regrouping (whole numbers). *Use abstract methods alongside concrete and pictorial for reference* 	Children draw place value charts and counters, circling groups of ten when exchanging. 	Children use columnar addition to represent and solve the calculation. 32 461 + 4 352 _____

Column method with regrouping (decimals) Introduce with place value counters 	Children draw place value charts and counters, circling groups of ten when exchanging. 	Children use columnar addition to represent and solve the calculation. 1 . 3 + 3 . 5 2 _____
Adding fractions with different denominators. Use a fraction wall to help with conversion. 	Drawing bar models or part-part-whole models. 	Convert and then write out the number sentence. Finish with simplifying if possible. $\frac{3}{4}+\frac{5}{8}=\frac{6}{8}+\frac{5}{8}=\frac{11}{8}=1\frac{3}{8}$

ADDITION - YEAR 6	
Objectives	Key Questions & Stem Sentences
• Add larger numbers, using the formal written method of columnar addition. • Use their knowledge of the order of operations to carry out calculations involving the 4 operations. • Calculate intervals across zero. • Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions.	• I do/do not need to make an exchange because … • … has greater priority than …, so the first part of the calculation I need to do is … • The difference between – 5 and −1 is 4 • The denominator has been multiplied by …, so the numerator needs to be multiplied by … • The lowest common multiple of … and … is … • …is made up of … wholes and … • Do I need to do jotting? Is there a written method for this?

Concrete	Pictorial	Abstract
Column method with regrouping (whole numbers). **Use abstract methods unless working below standard.**	Children draw place value charts and counters, circling groups of ten when exchanging.  	Children use columnar addition to represent and solve the calculation. 1 32 461 + 4 352 _____

As Year 5, with increasingly large numbers; **use predominantly abstract methods.**		
Column method with regrouping (decimals) Adding to be done with place value counters. 	Children draw place value charts and counters, circling groups of ten when exchanging.	Children use columnar addition to represent and solve the calculation. $\begin{array}{r} {\scriptstyle 1\quad\ 1} \\ 24.855 \\ +30.315 \\ \hline 55\ .170 \end{array}$
Order of operation. Using counters to represent parts. Use visual reminders to show the order	Drawing out the different parts when ordering the operations.  $3 \times 4 + 2 = 14$	Writing out the calculation: $(3 + 4) \times 2 = 14$

Progression in Calculations: Subtraction

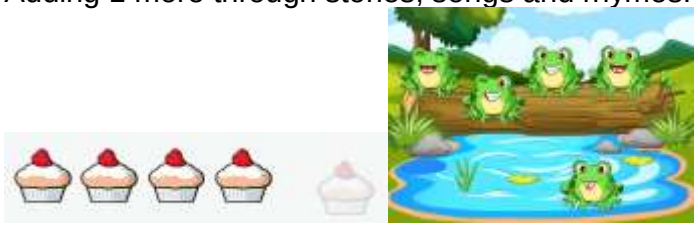
SUBTRACTION - Nursery	
Objectives	Key Questions & Stem Sentences
• Begin to have an understanding of numbers to 5 • We recommend focusing on noticing and representing small quantities, perceptual subitising and counting	• How many do you see? • How many are there? • Count out … from a larger group. E.g. Collect a cup from everyone at the table. • Show me… • Begin to link numerals to quantities. • How many do I have now?

Key Representations

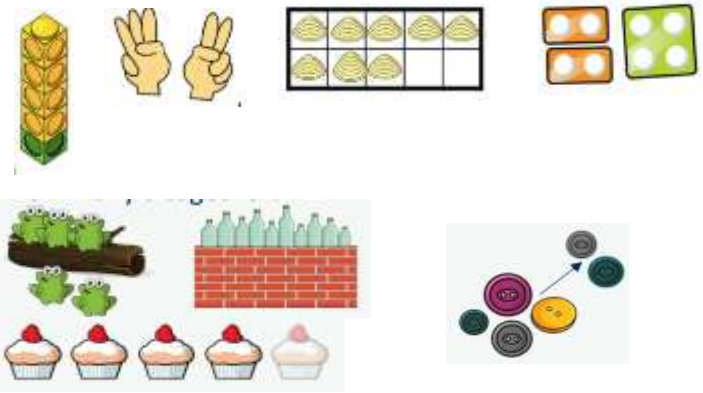
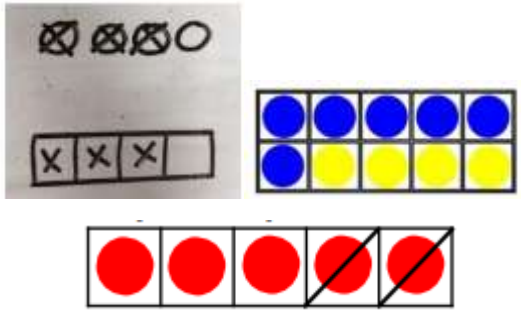
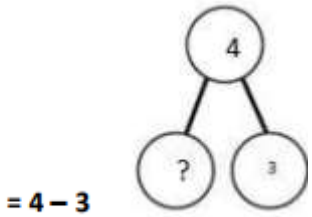
Instantly seeing how many.

Begin to count objects using 1-1 correspondence. Start by showing 1, 2 and 3 using fingers.

Adding 1 more through stories, songs and rhymes.

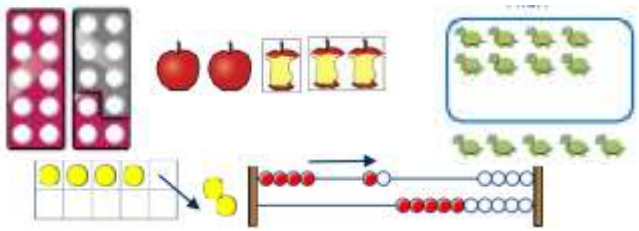
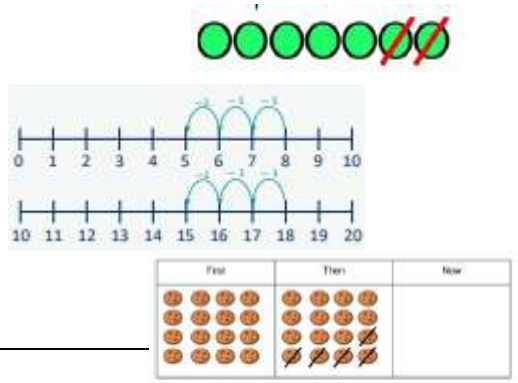
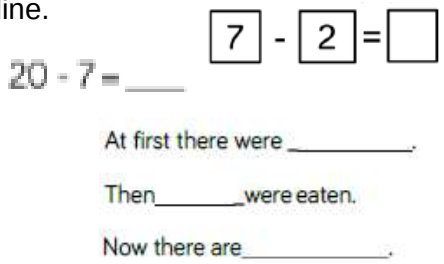


SUBTRACTION - Reception	
Objectives	Key Questions & Stem Sentences
● Have a deep understanding of numbers to 10, including the composition of each number. ● Subitise (recognise quantities without counting) up to 5 ● Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts.	● What do you see? How do you see it? ● 1 more than … is … ● How many…? How many altogether? ● How many ways can you make…? ● There are … altogether. I can see … here and … there. ● …. and …. make …. ● First… Then…. Now…. ● I have … I take … away Now I have …

Concrete	Pictorial	Abstract
Combining two parts to make a whole using various resources (e.g. fingers, counters, dominoes, teddy bears, cubes, Numicon, five and ten frames…) 	Children draw images to represent concrete apparatus, such as dots, and complete pre-drawn ten frames and part whole models 	Children are supported by teachers to complete number sentences, with a continued focus on concrete materials. 

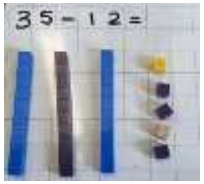
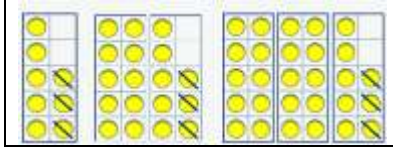
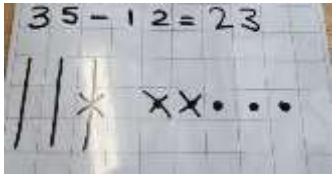
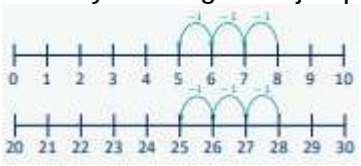
SUBTRACTION - YEAR 1

Objectives	Key Questions & Stem Sentences
• Read, write and interpret mathematical statements involving 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 zero. • Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9	• … is a part. … is a part. … is the whole. • There are … in total. … are … How many are not …? • … subtract … is equal to … … is equal to … − … • I start at … I jump back … I land on … • … minus … is equal to … … is equal to … − … • … is made of … and … … and … make … • … can be partitioned into … and … • … minus … is equal to … • … less than … is … so … less than … is … • What patterns do you notice? • How many more do you need to subtract to make …? • If … is the whole and … is a part, the other part must be…

Concrete	Pictorial	Abstract
Taking away ones, counting back and finding the difference using various resources e.g. shells, teddy bears, cars, Numicon, Dienes… 	Children cross out pictures and images, and make jumps back on a number line. 	Children use columnar addition to represent and solve the calculation. Exchange above the line. 

SUBTRACTION - YEAR 2	
Objectives	Key Questions & Stem Sentences

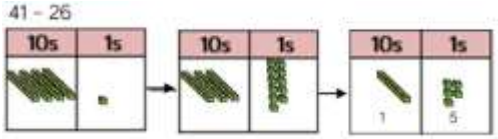
• Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100
• Subtract numbers using concrete objects, pictorial representations, and mentally, including:
  ○ a two-digit number and 1s
  ○ a two-digit number and 10s
  ○ 2 two-digit numbers
• Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
	• What do you notice? Can you continue the pattern?
	• I know that … minus ... = … so … minus … = ...
	• … less than … is … so … less than … is …
	• … can be partitioned into … and …
	• What do you notice? Which addition is the easiest to calculate?
	• … ones − … ones = … ones so … tens − … tens = … tens
	• … tens − … tens = … tens … tens and … ones = …
	• What is the same? What is different?
	• To subtract … I need to subtract 10 … times
	• I need to make an exchange because I do not have enough ones to subtract … ones.
	• How many do you need to subtract to make …?
	• If … is a whole and … is a part, then … is the other part.

Concrete	Abstract	Abstract
Use dienes to make the first number and take away the second number.  Use counters and a number lines to subtract. Make the amount with the counters and then remove. 	Draw the dienes and cross off the second number.  Drawing the number line and subtracting the ones by drawing each jump. 	Record as a number sentence. Write out the number sentence and continue if patterns are spotted $8-3=5$ $18-3=15$ $28-3=25...$

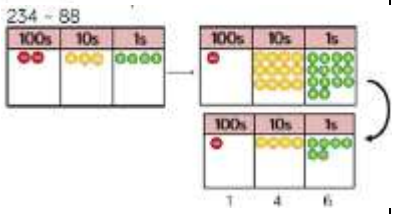
SUBTRACTION - YEAR 3

Objectives	Key Questions & Stem Sentences
• Subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds. • Subtract numbers with up to three digits, using formal written methods. • Subtract fractions with the same denominator within 1 whole.	• The ones/tens/hundreds column will decrease by … • ... ones − … ones = … ones ... tens − … tens = … tens ... hundreds − … hundreds = … hundreds • I need to subtract … ones. I do/do not need to make an exchange. I need to subtract ... tens. I do/do not need to make an exchange. I can exchange 1 … for 10 … • 100 minus … is equal to … • I subtract … tens, then I subtract … ones. • When subtracting fractions with the same denominator, I only subtract the numerator. … fifths − … fifths = … fifths

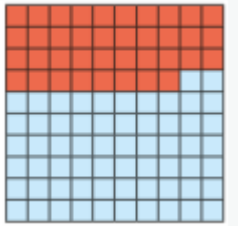
Concrete



Column method using Base 10/ Dienes, place value counters etc, having to exchange.

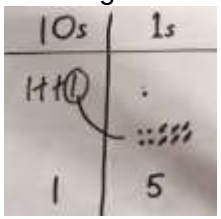


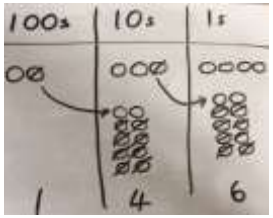
Compliments to 100. Building a 100 diene and removing parts to see what is left.



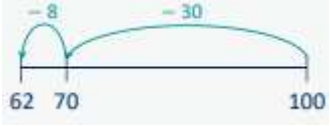
Pictorial

Children draw their own place value charts and represent the counters pictorially, remembering to show what has been exchanged.



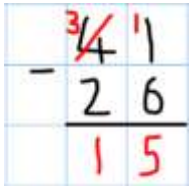


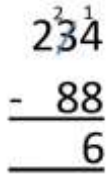
Compliments to 100. Representing the number sentence on a blank number line. Subtract the tens and then the ones.



Abstract

Formal column method. Children must understand what has happened when they have crossed out digits.

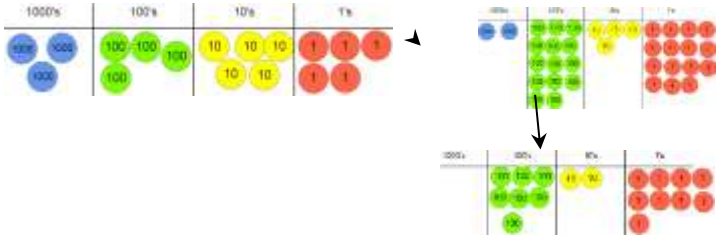
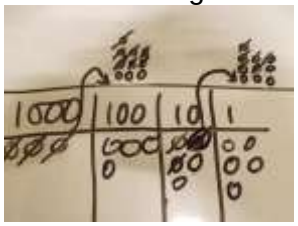
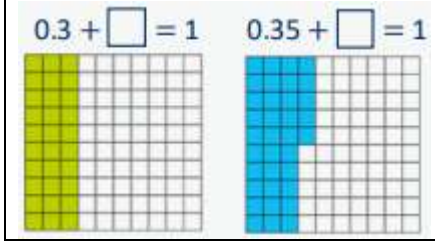
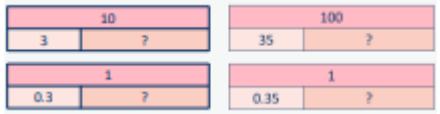




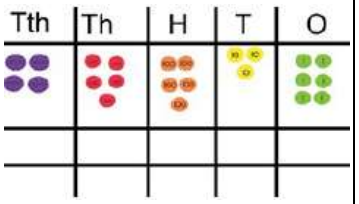
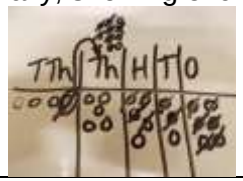
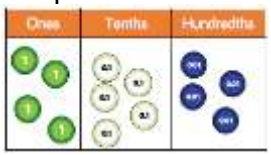
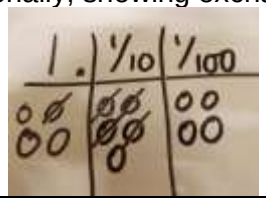
Writing out all possible calculations for a compliment:. Linked to fact families.

$100 - 38 = 62$
$100 - 62 = 38$
$62 = 100 - 38$
$38 = 100 - 62$

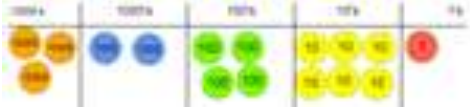
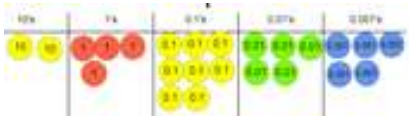
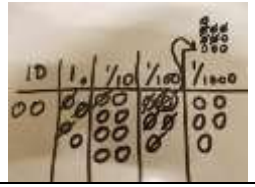
SUBTRACTION - YEAR 4	
Objectives	**Key Questions & Stem Sentences**
• Subtract whole numbers with more than 4 digits. • Subtract numbers mentally with increasingly large numbers. • Subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 • Subtract fractions with the same denominator, and denominators that are multiples of the same number.	• The ones/tens/hundreds/thousands column will decrease by … • I need to subtract… ones/tens/hundreds. I do/do not need to make an exchange. I can exchange 1… for 10… • I can partition £… into £… and 100p £… − £… = £… 100p − …p = …p • When subtracting fractions with the same denominator, I only subtract the numerator. … tenths − … tenths = … tenths • What patterns do you notice?

Concrete	Pictorial	Abstract
Column method with regrouping – Th HTU. Use of place value counters as needed. 	Children draw their own place value charts and represent the counters pictorially, remembering to show what has been exchanged. 	Formal column method. Children must understand what has happened when they have crossed out digits. 2 1 4 1 3,455 - 2,726 729
Compliments to 1. Use base 10 or place value counters to make the amounts and then subtract. 	Use related facts and part-part-whole models or bar models to show: 	Write out known facts to help identify the compliment and spot patterns. 10 − 4 = 6 1 − 0.4 = 0.6 100 − 44 = 56 1 − 0.44 = 0.56 1,000 − 444 = 556 1 − 0.444 = 0.556

SUBTRACTION - YEAR 5	
Objectives	Key Questions & Stem Sentences
• Subtract whole numbers with more than 4 digits. • Subtract numbers mentally with increasingly large numbers. • Subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 • Subtract fractions with the same denominator, and denominators that are multiples of the same number.	• I can exchange 1 … for 10 … • To subtract …, I can subtract … then add … • What patterns do you notice? • The denominator has been multiplied by …, so the numerator needs to be multiplied by… for the fractions to be equivalent. • Can this be done mentally? • Is there a more effective way of solving this problem?

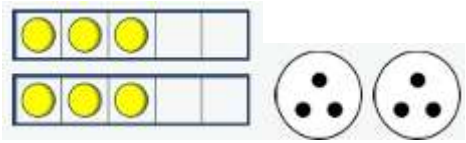
Concrete	Pictorial	Abstract
Column method with regrouping (whole numbers). *Use abstract methods alongside concrete and pictorial for reference* 	Children draw place value charts and represent counters pictorially, showing exchanging 	Formal column method. Children must understand what has happened when they have crossed out digits. 45,536 - 8,426 37,110
Column method with regrouping (decimals) Introduce with place value counters 	Children draw place value charts and represent counters pictorially, showing exchanging 	Formal column method. Children must understand what has happened when they have crossed out digits. 4 . 5 4 – 1 . 4

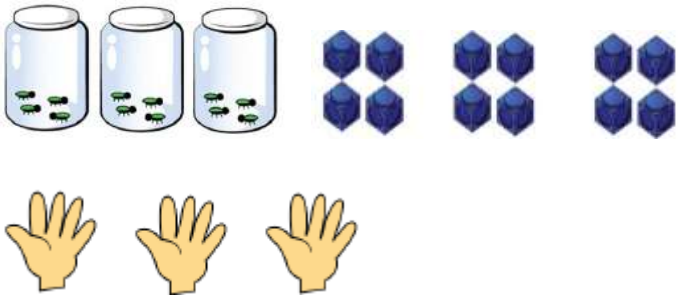
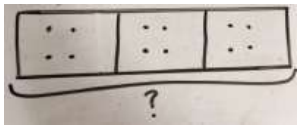
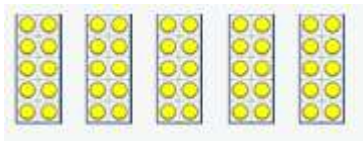
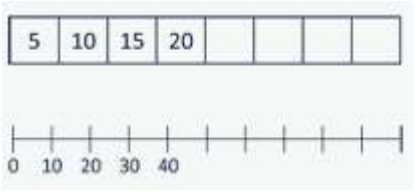
SUBTRACTION - YEAR 6	
Objectives	Key Questions & Stem Sentences
• Subtract larger numbers, using the formal written methods of columnar subtraction. • Use their knowledge of the order of operations to carry out calculations involving the 4 operations. • Calculate intervals across zero. • Subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	• I do/do not need to make an exchange because … • ... has greater priority than …, so the first part of the calculation I need to do is … • … minus … is equal to … • The difference between – 5 and −1 is 4 • The denominator has been multiplied by …, so the numerator needs to be multiplied by… • The lowest common multiple of … and … is … • … is made up of … wholes and …

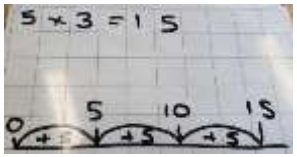
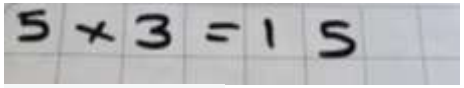
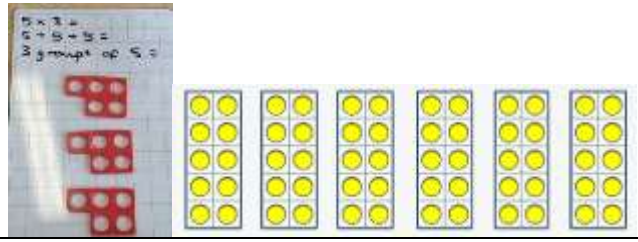
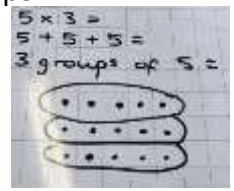
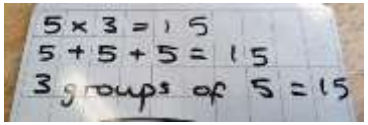
Concrete	Pictorial	Abstract
Column method with regrouping (whole numbers) As Year 5, with increasingly large numbers. **Use abstract methods unless working below standard.** 	Children draw place value charts and represent counters pictorially, showing exchanges. 	Children use columnar addition to represent and solve the calculation. 32 461 - 4 352 _____
Column method with regrouping (decimals) Subtracting to be done with place value counters. 	Children draw place value charts and represent counters pictorially, showing exchanges 	Children use columnar addition to represent and solve the calculation. 4 1 24.855 - 3.146 1 .709

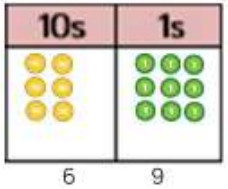
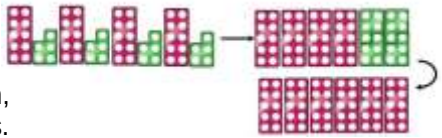
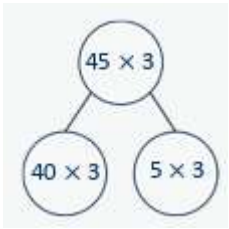
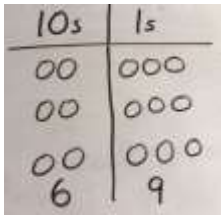
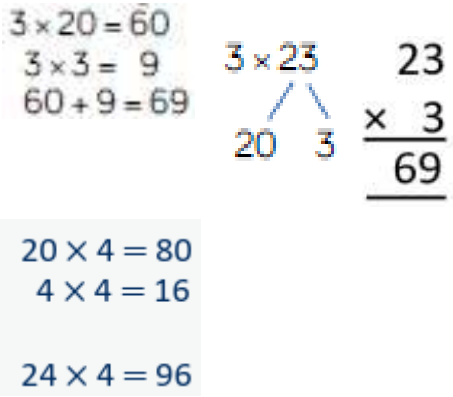
Progression in Calculations: Multiplication

MULTIPLICATION - Reception	
Objectives	Key Questions & Stem Sentences
● Have a deep understanding of number to 10, including the composition of each number. ● Subitise (recognise quantities without counting) up to 5 ● Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts. ● Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.	● Double … is … … is double … ● There are … groups of … There are … altogether. ● How many…? How many altogether? ● How many ways can you make…?

Concrete	Pictorial	Abstract
Combining two parts to make a whole using various resources (e.g. fingers, counters, dominoes, teddy bears, cubes, Numicon, five and ten frames…) 	Children draw images to represent concrete apparatus, such as dots, and complete pre-drawn ten frames and part whole models 	Children are supported by teachers to complete number sentences, with a continued focus on concrete materials.

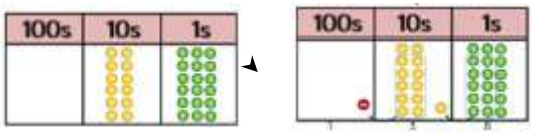
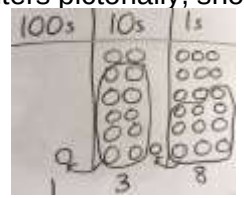
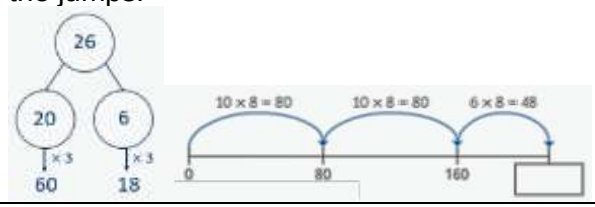
MULTIPLICATION - YEAR 1		
Objectives	Key Questions & Stem Sentences	
• Count in multiples of twos, fives and tens. • Solve one-step problems involving multiplication, using concrete objects, pictorial representations and arrays with the support of the teacher.	• There are … equal groups of … There are … altogether. • Continue to colour in ...s What do you notice? • Complete the number track/number line by counting in …s. • There are … groups of … There are … altogether. • What is the same? What is different? • There are … rows of … There are … altogether. There are … columns of … There are … altogether. • Double … is … … + … = …	
Concrete	Pictorial	Abstract
Use of base 10/ Dienes to calculate 2-digit x 1-digit 	Children draw images to represent concrete apparatus, including arrays.  	Completing number tracks/number lines  Children are supported to record what they have done to show understanding. $4 + 4 + 4 = 12$ $3 \times 4 = 12$ *Vocabulary of multiplication and ability to explain is developed before any recording of number sentences*

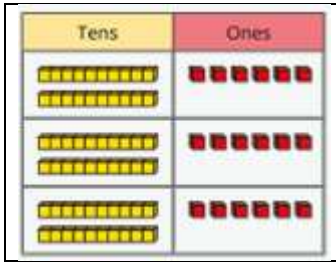
MULTIPLICATION - YEAR 2		
Objectives	Key Questions & Stem Sentences	
• Recall and use multiplication facts for the 2, 5 and 10 multiplication tables. • Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs. • Show that multiplication of two numbers can be done in any order (commutative).	• There are … equal groups with … in each group. There are … altogether. • There are … rows with … in each row. There are … columns with … in each column. • I can see … × … and … ×… • Double … is … so double … is … • … lots of 2 = … × 2 = • … times 2 is equal to … • … lots of 10 = … × 10 = • … is equal to … groups of … 18 socks, how many pairs?	
Concrete	Pictorial	Abstract
Repeated addition on a physical number line or bead string. 	Repeated addition on a blank number line. 	Recording as a number sentence.  $3 \times 5 = 15$ $5 \times 3 = 15$ $3 \times 5 = 5 \times 3$
Arrays - using Numicon/Base 10 to show the numbers in groups. 	Arrays – drawing dots or pictures to show the numbers in groups. 	Recording as a number sentence. 

MULTIPLICATION - YEAR 3		
Objectives	Key Questions & Stem Sentences	
• 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, including missing number problems, involving multiplication, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	• … groups of = … × 3 = , … times = 3 × … = • … times is equal to … • … × … ones is equal to … ones so … × … tens is equal to … tens. • … tens multiplied by … is equal to … tens. …ones multiplied by … is equal to … ones. • There are …. times as many … as … • … is … times the size of … … is … times the length/height of … • For every … , there are … possible ... There are … × … possibilities altogether.	
Concrete	Pictorial	Abstract
Use of base 10/ Dienes to calculate 2-digit x 1-digit  Use of arrays to represent related facts  Partition using Numicon, base 10, cuisinaire rods.	Children draw place value charts/part-part-whole models and represent counters pictorially, showing exchanging.  	Children record what it is they are doing to show understanding. 

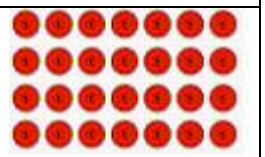
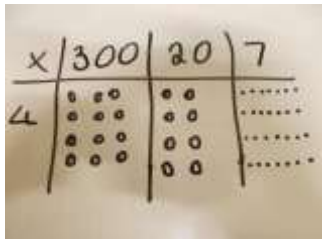
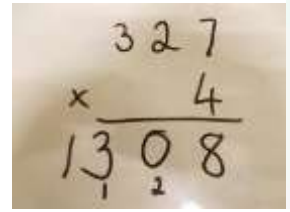
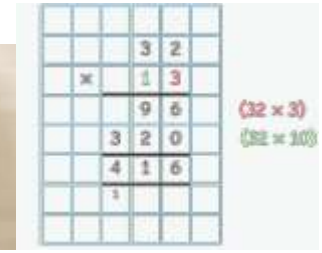
MULTIPLICATION - YEAR 4

Objectives	Key Questions & Stem Sentences
• Recall multiplication and division 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 3 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 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects	• … groups of … = … times … is equal to … … × … = • Any number multiplied by 1 is equal to … Any number multiplied by 0 is equal to … • To work out … × … × …, I can first calculate … × … and then multiply the answer by … • 12 = … × … , so … × 12 = …× … × … • When I multiply by 10, the digits move … place value column to the left. … is 10 times the size of … • When I multiply by 100, the digits move … place value columns to the left. … is 100 times the size of … • … × … ones is equal to … ones so … × … tens is equal to … tens and … × … hundreds is equal to … hundreds. • To multiply a 3-digit number by … , I multiply the ones by … , the tens by … and the hundreds by … • … is … times the size of … • For every … , there are … possibilities. There are … × … possibilities altogether.

Concrete	Pictorial	Abstract
Column multiplication- introduced with place value counters/ base 10 (2 and 3 digit multiplied by 1 digit) 	Children draw place value charts and represent counters pictorially, showing exchanging 	Children use formal column multiplication to represent and solve the calculation, alongside concrete and pictorial representations. 6 x 23 = 23 × 6 138 1 1 Children to record what it is they are doing to show understanding. 3 × 23 3 × 20 = 60 3 × 3 = 9 20 3 60 + 9 = 69
Mental strategies to partition 2- and 3-digit numbers to multiply using informal methods.	Draw part-part-whole models to represent partitioning. Drawing a number line to show the jumps. 	Writing the number sentence out including the partitioning. $26 \times 8 = 80 + 80 + 48 = 208$

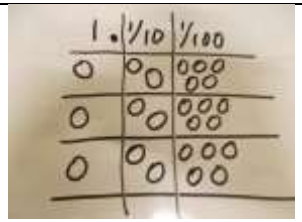
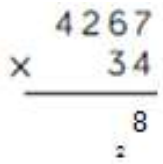
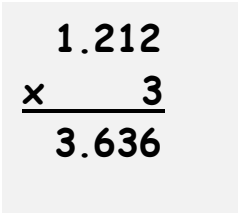
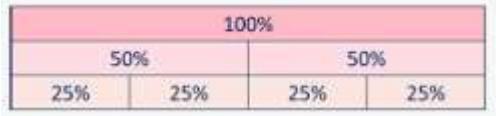
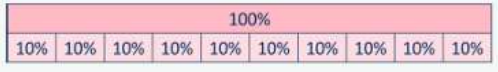
		

MULTIPLICATION - YEAR 5		
Objectives	Key Questions & Stem Sentences	
• Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) • Multiply 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 • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	• … is a multiple of … because … × … = … • … is a factor of … because … × … = … • The common factors of … and … are … • … squared means … × …/… cubed means … × … × … • To multiply a 4-digit number by … , I multiply the ones by … , the tens by … , the hundreds by … and the thousands by … • I can partition … into … and … • First, I multiply by the … Then I multiply by the … • To multiply by 10/100/1,000, I move all the digits … places to the left. … is 10/100/1,000 times the size of … • The most efficient strategy to calculate … × … is … To calculate … × 12, I can do … × … × … • To multiply a fraction by an integer, I multiply the numerator by the integer and the denominator remains the same. • If ?/? is … , then 1/? is … and the whole is … × …	
Concrete	Pictorial	Abstract

Column multiplication (up to 4 digits multiplied by 1 or 2 digits). Exchange below the line. Primarily abstract; concrete and pictorial images to be used as necessary. x | 300 | 20 | 7 4 | | | 	Children draw place value charts and represent counters pictorially, showing exchanging 	Children use formal column multiplication to represent and solve the calculation. *Exchange below the line*.  

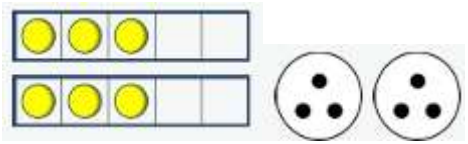
MULTIPLICATION - YEAR 6	
Objectives	Key Questions & Stem Sentences
Identify common factors and common multiples. Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. Multiply numbers by 10, 100 and 1,000 Multiply one-digit numbers with up to two decimal places by whole numbers. Use their knowledge of the order of operations to carry out calculations involving the 4 operations. Multiply simple pairs of proper fractions, writing the answer in its simplest form. Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. Solve problems involving the calculation of percentages.	● To multiply by a 2-digit number, first multiply by the ones, then multiply by the tens and then find the total. ● To multiply by 10/100/1,000, I move all the digits … places to the left. … is 10/100/1,000 times the size of … ● … has greater priority than …, so the first part of the calculation I need to do is … ● I know that …× …= …, so I also know that …× … = … ● I need to exchange 10 … for 1 … ● When multiplying a pair of fractions, I need to multiply the numerator and multiply the denominator. ● There are … lots of … % in 100% To find … %, I need to divide by … ● For every … , there are …

Concrete	Pictorial	Abstract
Column multiplication (multi-digit up to 4 digits by a 2 digit). Children should be confident to use **abstract**	Children represent multiplication of decimals pictorially.	Children use formal column multiplication to represent and solve the calculation. *Exchange below the line.*

methods once they start multiplying by more than 3 digits. Use place value counters alongside multiplying decimals.		 
Fraction/Percentage Wall 	Drawing bar models to help calculate percentages 	Writing our stem sentences and equations To find 30%, I can find 10% and then multiply it by 3 To find 23%, I can use 10% × 2 and 1% × 3 To find 99%. I can find 1%, then subtract from 100% 50% of … = …÷ 2 25% of … = …÷ 4

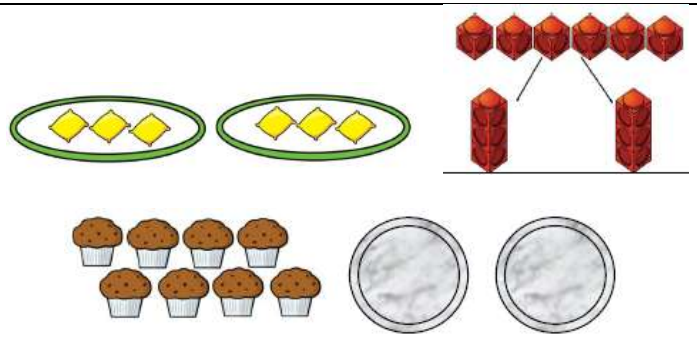
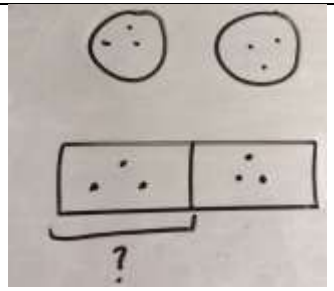
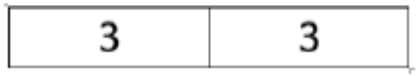
Progression in Calculations: Division

DIVISION - Reception	
Objectives	Key Questions & Stem Sentences
• Have a deep understanding of number to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5 • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts. • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.	• There are … altogether. They are shared equally between … groups. • There are … groups of … There are … altogether. • How many…? • How many ways can you share…?

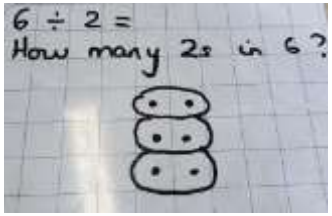
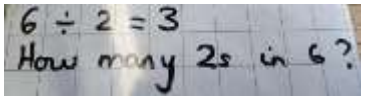
Concrete	Pictorial	Abstract
Combining two parts to make a whole using various resources (e.g. fingers, counters, dominoes, teddy bears, cubes, Numicon, five and ten frames…) 	Children draw images to represent concrete apparatus, such as dots, and complete pre-drawn ten frames and part whole models 	Children are supported by teachers to complete number sentences, with a continued focus on concrete materials.

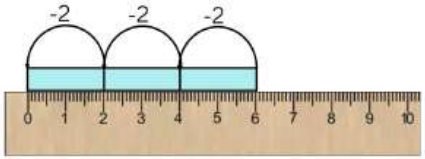
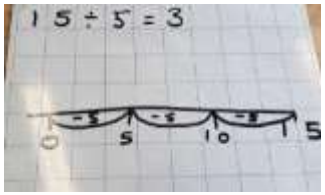
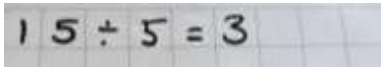
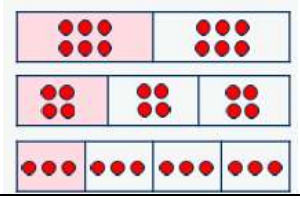
DIVISION - YEAR 1	
Objectives	Key Questions & Stem Sentences
• Solve simple one-step problems involving division, using concrete objects, pictorial representations and arrays with the support of the teacher. • Recognise, find and name a half as one of two equal parts of a quantity. • Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	• There are … altogether. How many groups of … can you make? • Circle groups of 2 There are … groups of 2 • Take … cubes. Make equal groups. There are … groups of … • … have been shared equally between… There are … on/in each … • Take … cubes. Share them between … 12 shared between … is … • To find half, I need to share into 2 equal groups. • To find a quarter, I need to share into 4 equal groups. • Half/Quarter of … is … • If … is half/one quarter, what is the whole?

Concrete	Pictorial	Abstract
Children split or share objects equally	Children represent sharing pictorially	Children record what it is they are doing to show understanding.

		6 ÷ 2 = 3  ___ cakes shared equally between 2 is ___ *Vocabulary of multiplication and ability to explain is developed before any recording of number sentences*

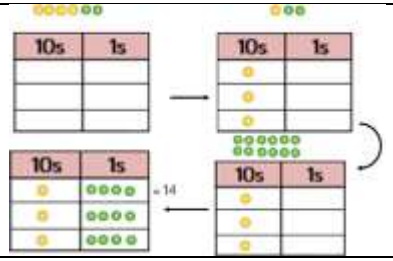
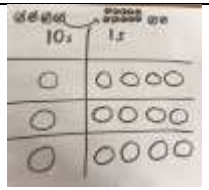
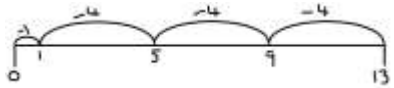
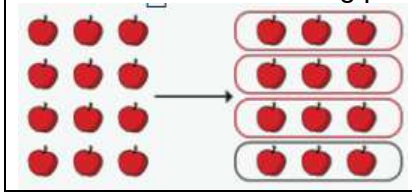
DIVISION - YEAR 2	
Objectives	Key Questions & Stem Sentences
• Recall and use division facts for the 2, 5 and 10 multiplication tables. • Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs. • Recognise, find, name and write fractions 1 , 1 , 2 and of a quantity.	• There are … equal groups of 2 … ÷ 2 = … • … shared equally between 2 is … Half of … is … … ÷ 2 = … • … divided by 2/ /10 is equal to … • The objects have been shared fairly into … groups. 1/? of … is … • There are … equal parts. There is … part circled. 1/? is circled.

Concrete	Pictorial	Abstract
Arrays - using Numicon to show the numbers in groups. 	Arrays – grouping dots or pictures. 	Recording as a number sentence. 

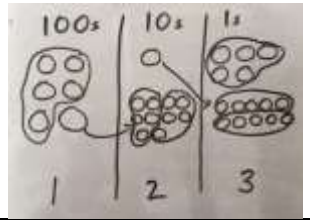
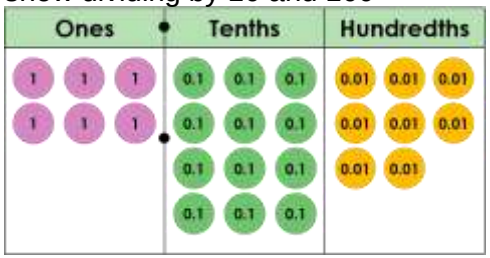
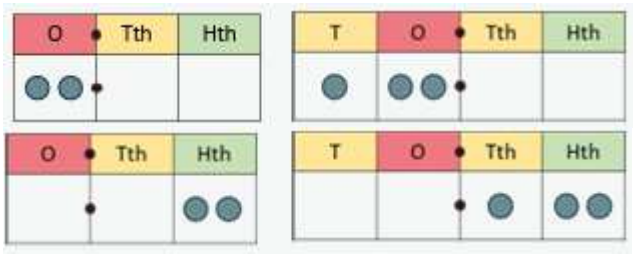
Repeated subtraction on a number line (Cuisenaire rods can be used above a ruler). 	Repeated subtraction on a blank number line. 	Recording as a number sentence. 
Sharing out objects when finding out fraction of amounts 	Drawing bar model to represent fraction of amount. 	Writing the fraction of amount as an equation

DIVISION - YEAR 3	
Objectives	Key Questions & Stem Sentences
● Recall and use division facts for the 3, 4 and 8 multiplication tables ● Write and calculate mathematical statements for division using the multiplication tables that they know, using mental and progressing to formal written methods ● Recognise, find and write fractions of a discrete set of objects: unit fractions and nonunit fractions with small denominators.	● There are … groups of in … … ÷ 4 = ● … has been shared equally into equal groups. … ÷ 4 = ● … ÷ … is equal to …, so … tens ÷ … is equal to … tens. ● … tens divided by … is equal to … tens. … ones divided by … is equal to … ones. ● There are … groups of … There are … remaining. ● One … of … is … ● 1/? of … is …, so ?/? of … is …

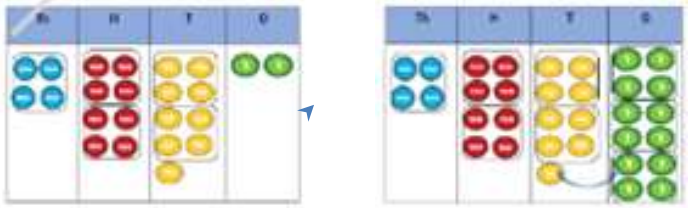
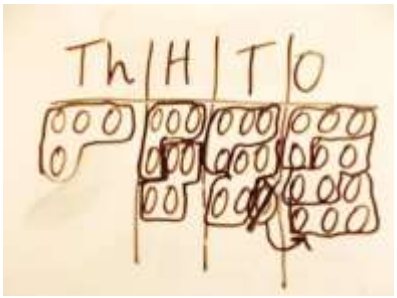
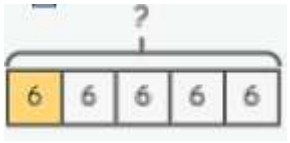
Concrete	Pictorial	Abstract
2 digits divided by 1 digit: sharing using base 10 or place value counters	Children represent the place value counters pictorially.	Children to be able to make sense of the place value counters and write calculations to show the process.

		42 – 3 42 = 30 + 12 30 – 3 = 10 12 – 3 = 4 10 + 4 = 14
Calculate division with a remainder-using lollipop sticks, times tables facts and repeated subtraction 		Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line. '3 groups of 4, with 1 left over' 
Fraction of amounts using practical objects 	Drawing the bar model identifying the base 10 when sharing out the values. 	Writing the fraction of amount as an equation $\frac{2}{3}$ of 36 is 24

DIVISION - YEAR 4	
Objectives	Key Questions & Stem Sentences
• Recall multiplication and division facts for multiplication tables up to 12 × 12 • Use place value, known and derived facts to divide mentally, including dividing by 1 • Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.	• There are … groups of … in … … ÷ … = • … has been shared equally into … equal groups. … ÷ … = • When I divide a number by 1, the number remains the same. • When I divide a number by itself, the answer is 1 • … ÷ … is equal to … so … tens ÷ … is equal to … tens and … hundreds ÷ … is equal to … hundreds. • I can partition … into … tens and … ones. • I cannot share the hundreds/tens equally, so I need to exchange 1 … for 10 … • When I divide by 10/100, the digits move 1/2 place value column to the right. … is one-tenth the size of …
Concrete	Pictorial / Abstract

Division with a remainder using place value counters. Short division (up to 3 digits by 1 digit- concrete and pictorial) . 615 ÷ 5 	Division with a remainder: represent counters on place value chart. Short division (up to 3 digits by 1 digit- concrete and pictorial). 615 ÷ 5 	Lead to short 'bus stop' division. $5\overline{)615}$ = 123
Use place value counters and a place value chart to show dividing by 10 and 100 	Drawing out place value charts to show dividing by 10 and 100 	Writing out the equation $2 \div 10 = 0.2$ $12 \div 10 = 1.2$ $2 \div 100 = 0.02$ $12 \div 100 = 0.12$

DIVISION - YEAR 5	
Objectives	Strategies
• 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 1,000	• I can partition … into … and … to help me to divide more easily. • I can show groups of … on a number line. • To divide by …, I can divide by … and then divide the result by … • There are … groups of … hundreds/tens/ones/ in … I can exchange 1 … for 10 … • To divide by 10/100/1,000, I move all the digits … places to the right. … is one-tenth/one-hundredth/one-thousandth the size of • To find ?/? of … , I need to divide by … and multiply by … …

Concrete	Pictorial	Abstract
Short division (up to 4 digits by a 1 digit number including remainders) using place value counters and showing the exchanging. 	Represent counters with images. 	Short 'bus stop' division $4\overline{)4892}$ = 1223
Sharing place value counters for finding fraction of amounts 	Drawing bar model to show fraction of amounts 	Writing equations for fraction of amounts $\frac{1}{5}$ of ___ = 6 $\frac{1}{4}$ of 84 = $\frac{4}{7}$ of ___ = 24 $\frac{3}{4}$ of 84 =

DIVISION - YEAR 6

Objectives

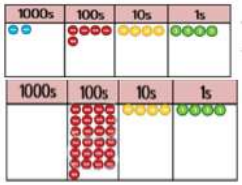
- Perform mental calculations, including with mixed operations and large numbers.
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.
- 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.
- Divide numbers by 10, 100 and 1,000 giving answers up to three decimal places.
- Use written division methods in cases where the answer has up to two decimal places.
- Associate a fraction with division and calculate decimal fraction equivalents.
- Divide proper fractions by whole numbers [for example, 1 ÷ 2 = 1]
- Solve problems involving the calculation of percentages.

Strategies

- There are … groups of … hundreds/tens/ones/ in … I can exchange 1 … for 10 …
- To divide by … , I can first divide by … and then divide the answer by …
- … has greater priority than …, so the first part of the calculation I need to do is …
- To divide by … , I move the digits … places to the right.
- I know that …÷ …= …, so I also know that …÷ … = …
- I need to exchange 1 … for 10 …
- The fraction … is equivalent to the decimal …
- … is equivalent to … so …÷ …= …÷ …
- … % is made up of … %, and … %
- For every … , there are …

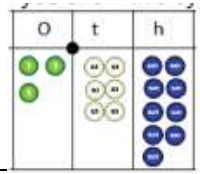
Concrete

Long division with place value counters (<4-digits x 2 digits)



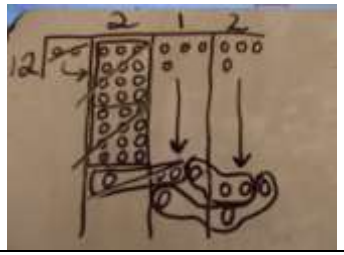
Remainders to be given in fraction or decimal form unless alternative context is given.

Place value counters used to divide decimals (leading to formal written method of short 'bus stop' division – see Y4/Y5).

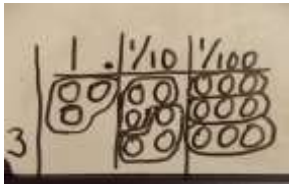


Pictorial

Formal written method of long division using a 'Help box' for tables > 12.

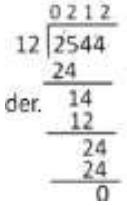


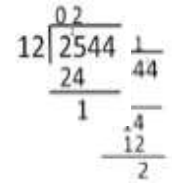
Representation of place value counters

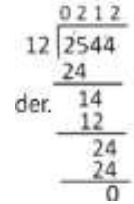


Abstract

Writing out the equation using short or long division







Formal written method of short ('bus stop') division

$$3\overline{)3.69}\quad 1.23$$