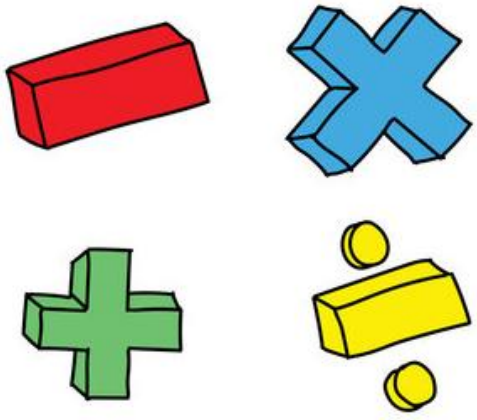
St Michael and St Martin Catholic Primary School

Learning our faith, living our faith, loving our faith

Calculation Policy



Key Principles

At St Michael and St Martin Catholic Primary School, we are committed to developing confident, resilient and independent mathematicians who are fluent in calculation and able to reason, explain and solve problems with confidence. Utilising the mastery approach, children are encouraged to develop a deep conceptual understanding of mathematics through carefully sequenced learning, rich mathematical discussion and opportunities to make connections between mathematical concepts. This reflects our whole-school commitment to enabling every child to excel in their learning through high expectations, inclusive teaching and a belief that all pupils can succeed in mathematics.

This calculation policy supports that vision by providing a clear progression in the teaching of the four operations from Nursery to Year 6. It is divided into four sections: ***addition, subtraction, multiplication and division****. At the beginning of each section, there is an overview showing the progression of skills across the primary years, including the development of calculations involving fractions and decimal numbers where appropriate.*

We use the White Rose Maths schemes of learning to deliver the aims of the National Curriculum (Years 1-6) and Development Matters (EYFS). Throughout this policy, teaching follows the ***Concrete–Pictorial–Abstract (CPA)*** *approach, enabling children to develop a secure conceptual understanding before moving towards efficient abstract methods. Children are first given opportunities to explore mathematical concepts using practical resources before representing their thinking through carefully chosen pictorial models and finally recording their understanding using efficient abstract methods. Throughout the policy, key representations, mathematical vocabulary, sentence stems and questioning are identified to support children in explaining their reasoning and developing mathematical fluency.*

Children are expected to develop a secure understanding of each stage before progressing to increasingly complex methods. For example, when learning to add across a multiple of ten, pupils first develop a secure understanding of bridging ten before applying this understanding to related facts and more efficient calculation strategies. This ensures that written methods are built upon secure conceptual understanding rather than memorisation, enabling all pupils to become accurate, efficient and flexible mathematicians.

Concrete–Pictorial–Abstract (CPA) Approach

At St Michael and St Martin Catholic Primary School, we believe that children develop a deep and secure understanding of mathematics when they are given opportunities to explore concepts in a range of ways. Following the ***Concrete–Pictorial–Abstract (CPA)*** *approach, children are supported to move from practical experiences, to visual representations, and finally to efficient abstract calculations.*

The CPA approach is central to the teaching of mathematics within the White Rose Maths curriculum, which we use to support our delivery of Development Matters and the National Curriculum aims. It ensures that children understand the meaning behind mathematical procedures rather than simply memorising methods. By making connections between different representations, children develop fluency, reasoning skills and the confidence to apply their mathematical understanding to a range of problems.

The CPA approach is not a linear process where children complete one stage before moving permanently onto the next. Instead, children continue to revisit and use concrete and pictorial representations throughout their mathematical journey, particularly when encountering new or more challenging concepts. These representations provide valuable tools to support reasoning, explain thinking and deepen understanding.

Concrete: Children first experience mathematics through practical resources and real-life contexts.

Concrete resources allow children to physically explore mathematical ideas and understand what calculations represent. Through manipulating objects, children can see and discuss the structure of a calculation before recording it symbolically.
Examples of concrete resources include:

- *counters*
- *cubes*
- *tens frames*
- *bead strings and rekenreks*
- *Numicon*
- *place value counters*
- *base ten equipment*
- *everyday objects*

For example, when learning addition, children may combine two groups of objects to understand that addition represents joining quantities together. When learning subtraction, children may physically remove objects from a group to understand the concept of taking away or compare two quantities to find a difference.

Pictorial: Children represent their mathematical thinking using images and models.

Pictorial representations act as a bridge between practical experiences and abstract calculations. They allow children to visualise mathematical structures and make connections without relying solely on physical resources.

Examples of pictorial representations include:

- *part-whole models*
- *bar models*
- *number lines*
- *arrays*
- *place value charts*
- *tens frames*
- *drawings and diagrams*

For example, a child may progress from using place value counters to drawing counters or a place value chart to represent an addition calculation. These representations support children in explaining their methods and developing reasoning skills.

Abstract: Children use mathematical symbols, numbers and efficient written methods.

Once children have developed secure understanding through concrete and pictorial representations, they are supported to record calculations using increasingly efficient abstract methods. At this stage, children understand not only how to complete a calculation but also why the method works.

Abstract methods include:

- *number sentences*
- *formal written methods*
- *mental calculation strategies*
- *efficient algorithms*

For example, when children use the column addition method, they understand the value of each digit and why exchanging ten ones for one ten is necessary, rather than simply following a set of steps.

Developing Mathematical Language Through CPA

A key part of the CPA approach is enabling children to communicate their mathematical thinking. Throughout lessons, children are encouraged to use precise mathematical vocabulary, explain their reasoning and make connections between representations.

Teachers use carefully planned questioning and sentence stems to support children in articulating their understanding, for example:

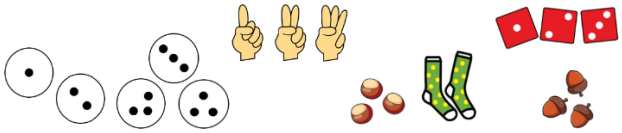
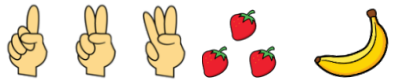
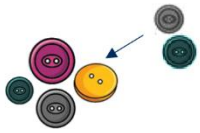
- *I know this because...*
- *I have represented this calculation by...*
- *The same calculation can also be shown using...*
- *I noticed that...*
- *I can explain my method because...*

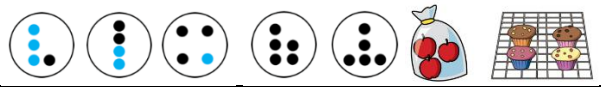
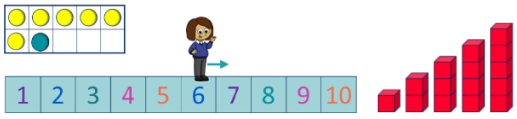
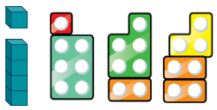
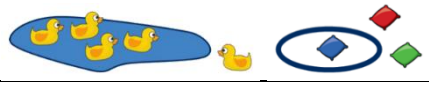
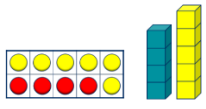
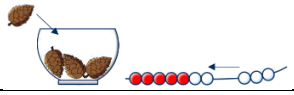
Through the CPA approach, children at St Michael and St Martin are supported to become confident mathematicians who can calculate accurately, reason clearly and apply their understanding to new and unfamiliar situations.

Addition

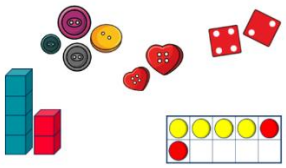
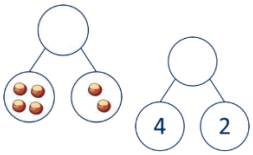
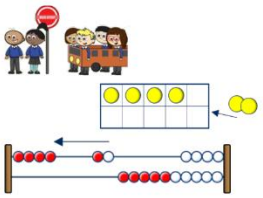
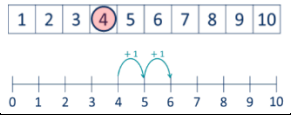
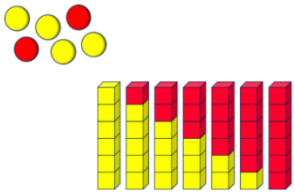
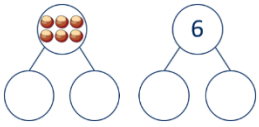
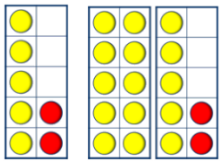
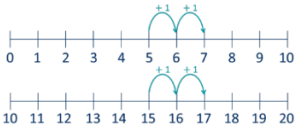
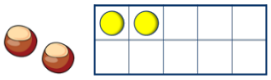
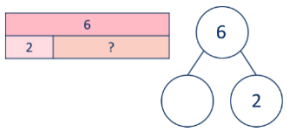
Year group	Skill
Nursery	• Subitise to 3 • Count how many • Make numbers to 5 • Add 1 more (through songs and rhymes)
Reception	• Conceptually subitise to 5 • 1 more • Notice the composition of numbers within 10 • Combine 2 groups • Add more
Year 1	• Add together • Add more • Bonds within 10 • Related facts within 20 • Missing numbers
Year 2	• 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
Year 3	• 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
Year 4	• 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
Year 5	• 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
Year 6	• Add integers up to 10 million • Add decimals with up to 3 decimal places • Order of operations • Negative numbers • Add fractions

Addition

Nursery	
Progression of Skill	**Representation**
Subitise to 3	How many do you see? 
Count how many	How many are there?  Count out … from a larger group. E.g. Collect 3 beanbags for a game.
Make numbers to 5	Show me… 
	Begin to link numerals to quantities. 
Add 1 more	How many do I have now? 

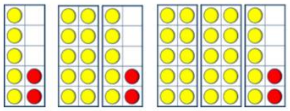
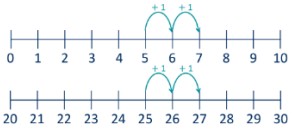
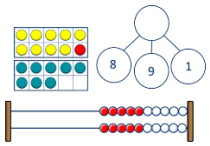
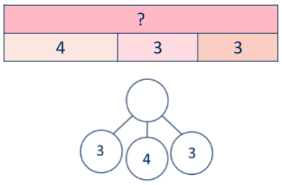
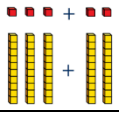
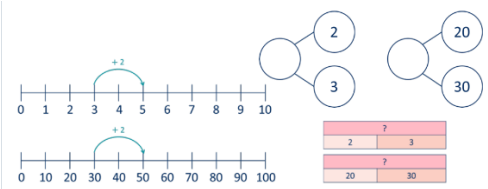
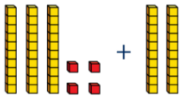
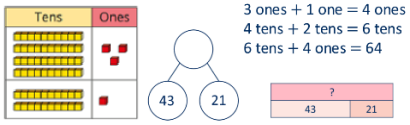
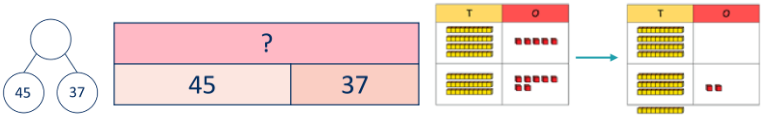
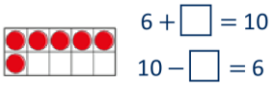
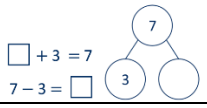
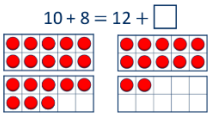
Reception		
Progression of Skill	**Representation**	
Conceptually subitise to 5	What do you see? How do you see it? 	
1 more	1 more than … is … 	
Notice the composition of numbers within 10	How many…? How many…? How many altogether? 	How many ways can you make…? 
Combine 2 groups	There are …. There are …. There are …. altogether. 	…. and …. make …. 
Add more	First… Then…. Now…. 	I have …. I add …. more. Now I have…. 

Addition

Year 1			
Progression of Skill	**Representation**		
Add together	*There are …* *There are …* *There are … altogether.* 	*… is a part.* *… is a part.* *… is the whole.* 	*… plus … is equal to …* *… is equal to …. + …* 4 + 2 = 6 2 + 4 = 6 6 = 4 + 2 6 = 2 + 4
Add more	*First… Then… Now…* 	*I start at …* *I jump on …* *I land on …* 	
Bonds within 10	*… is made of … and …* *… and … make …* 	*… can be partitioned into … and …* 	*… plus … is equal to …* 6 + 0 = 6 5 + 1 = 6 4 + 2 = 6 3 + 3 = 6 2 + 4 = 6 1 + 5 = 6 0 + 6 = 6
Related facts within 20	*I know that … and … = … so … and … = …* 	*… more than … is … so … more than … is …* 	*What patterns do you notice?* 5 + 2 = 7 15 + 2 = 17 7 = 5 + 2 17 = 15 + 2
Missing numbers	*How many more do you need to make …?* 	*If … is the whole and … is a part, the other part must be…* 	*… plus … is equal to …* $2 + \square = 6$ $6 = 2 + \square$ 

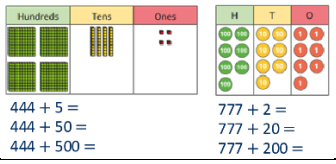
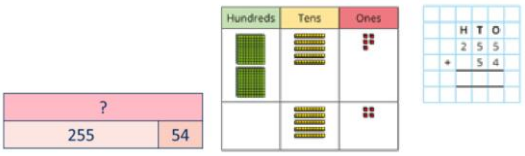
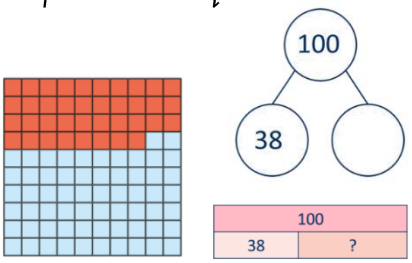
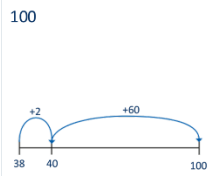
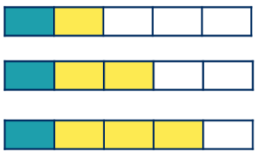
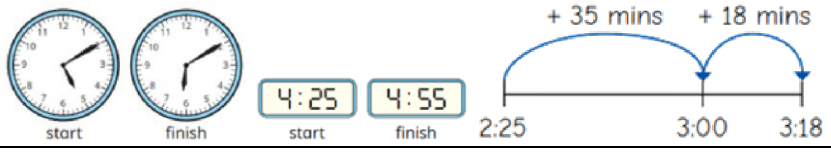
Addition

Year 2

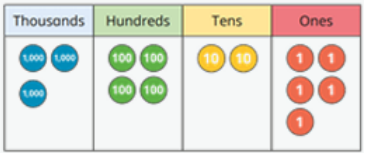
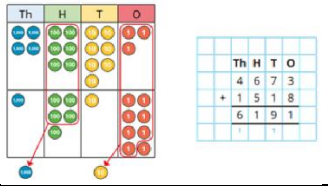
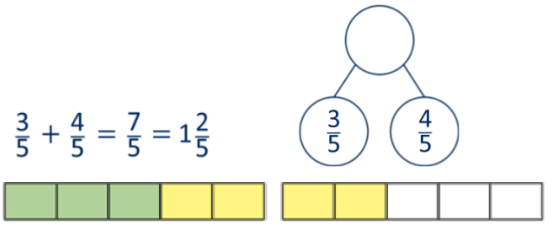
Progression of Skill	Representation		
Add 1s to any number (related facts)	I know that … and … = … so … and … = … 	… more than … is … so … more than … is 	What do you notice? Can you continue the pattern? 5 + 2 = 7 15 + 2 = 17 25 + 2 = 27…
Add three 1-digit numbers	… and … are a bond to 10 10 + … = … 	Double … + … = … 	What do you notice? Which addition is the easiest to calculate? 8 + 9 + 1 = 8 + 1 + 9 = 9 + 1 + 8 =
Add across a 10	… can be partitioned into … and … 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		
Add multiples of 10	… ones + … ones = … ones so … tens + … tens = … tens 	What is the same? What is different? 	
Add 10s to any number	… tens + … tens = … tens … tens and … ones = … 	To add … I need to add 10 … times. 	I know that … and … = … so … and … = … 30 + 20 = 50 34 + 20 = 54
Add two 2-digit numbers (not across a ten)	… ones + … ones = … ones … tens + … tens = … tens 		
Add two 2-digit numbers (across a ten)	There are …. ones, so I do/do not need to make an exchange. … ones = … ten and … ones 		
Missing numbers	How many more do you need to make …? 	If … is a whole and … is a part, then … is the other part. 	… can be partitioned into … and … 

Addition

Year 3

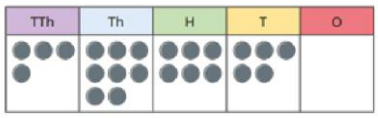
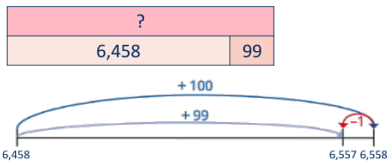
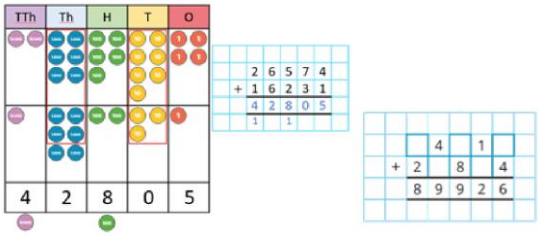
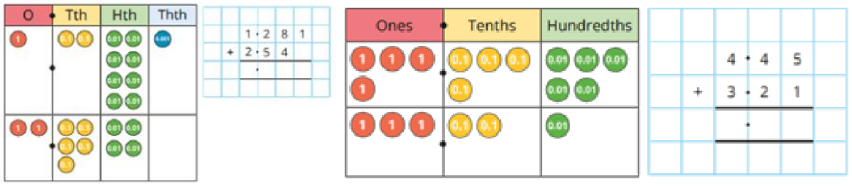
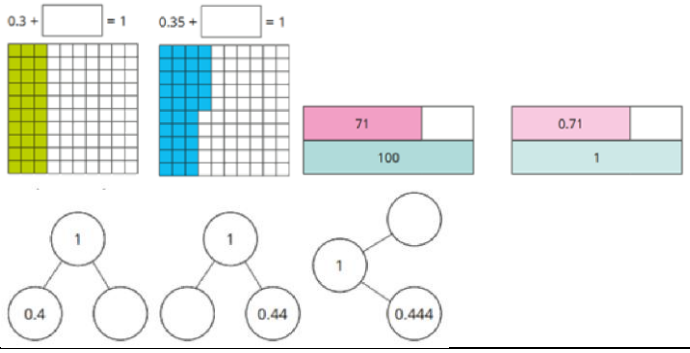
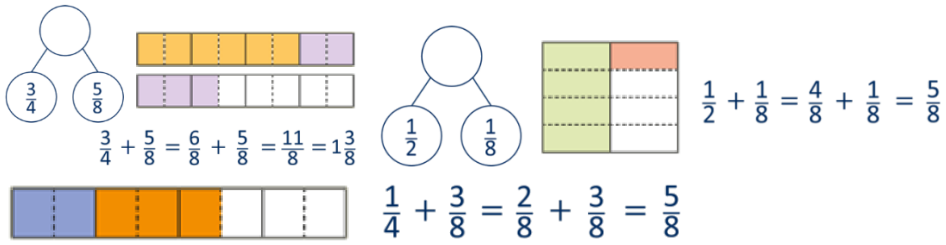
Progression of Skill	Representation	
Add 1s, 10s or 100s to a 3-digit number	The ones/tens/hundreds column will increase by … 	What patterns do you notice? 235 + 3 = 235 + 30 = 235 + 300 = 111 + ☐ = 118 111 + ☐ = 181 111 + ☐ = 811
Add two numbers (no exchange)	… ones + … ones = … ones … tens + … tens = … tens … hundreds + … hundreds = … hundreds 	
Add two numbers across a 10 or 100	There are … ones, so I do/do not need to make an exchange. There are … tens, so I do/do not need to make an exchange. … ones = … ten and … ones. … tens = … hundred and … tens. 	
Complements to 100	… plus … is equal to 100 	I add … to get to the next 10, then … to get to 100  38 + 62 = 100 62 + 38 = 100 100 = 38 + 62 100 = 62 + 38
Add fractions with the same denominator within 1 whole	When adding fractions with the same denominator, I only add the numerator. … fifths + … fifths = … fifths  $\frac{1}{5} + \frac{1}{5}$ $\frac{1}{5} + \frac{2}{5}$ $\frac{1}{5} + \frac{3}{5}$	
Calculate the duration of events	From … to … o'clock is … minutes. From … o'clock to … is … minutes. The total time taken is … minutes. 	

Addition

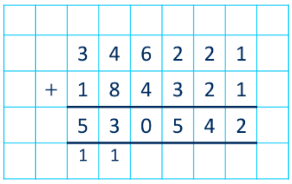
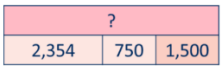
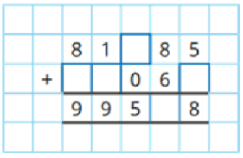
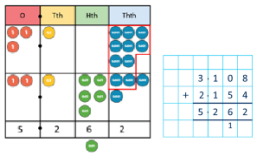
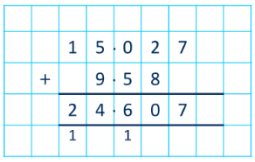
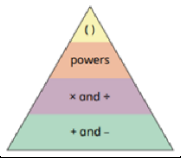
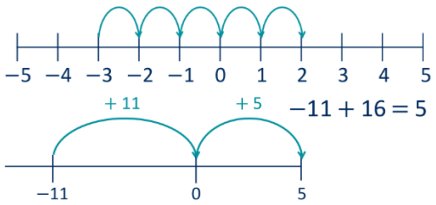
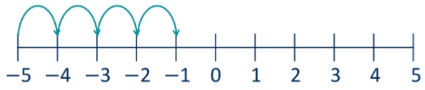
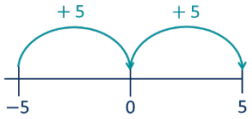
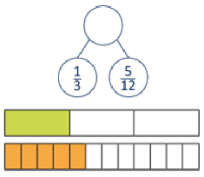
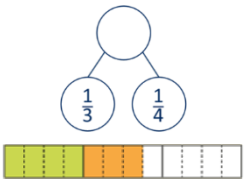
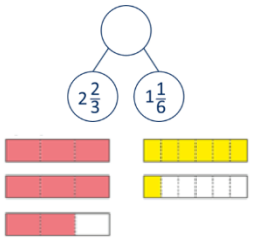
Year 4		
Progression of Skill	**Representation**	
Add 1s, 10s and 100s to a 4-digit number	*The ones/tens/hundreds/thousands column will increase by …*  *3,425 + 3 =* *3,425 + 30 =* *3,425 + 300 =* *3,425 + 3,000 =*	*What patterns do you notice?* *2,350 + 3 =* *2,350 + 30 =* *2,350 + 300 =* *2,350 + 3,000 =* *6,040 + 200 =* *6,040 + 500 =* *6,040 + 900 =*
Add up to two 4-digit numbers	*There are … ones/tens/hundreds so I do/do not need to make an exchange.* *I can exchange 10 … for 1 …*  	
Add decimal numbers in the context of money	*… pence + … pence = … pence …* *pounds + … pounds = … pounds* *45p + 25p = 70p* *£2 + £3 = £5* *£5 + 70p = £5.70*	*£3.25 can be partitioned into* *£3 + 20p + 5p*
Add fractions and mixed numbers with the same denominator beyond 1 whole	*When adding fractions with the same denominator, I only add the numerator.* *… fifths + … fifths = … fifths*  	

Addition

Year 5

Progression of Skill	Representation
Add using mental strategies	 *48,650 + 300 =* *48,650 + 30,000* *= 48,650 + 30 =* *To add …, I can add … then subtract …* 48,650 + 300 = 48,650 + 30,000 = 48,650 + 30 = 
Add whole numbers with more than 4 digits	*I can exchange 10 … for 1 …* 
Add decimals with up to 2 decimal places	*I do/do not need to make an exchange because …* *I can exchange 10 … for 1 …* 
Complements to 1	
Add fractions with denominators that are a multiple of one another	*The denominator has been multiplied by …, so the numerator needs to be multiplied by… for the fractions to be equivalent.* 

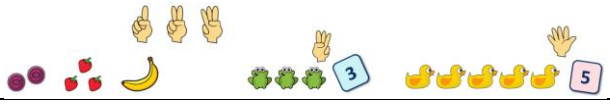
Addition

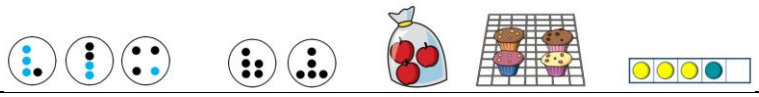
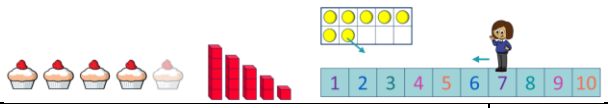
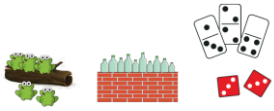
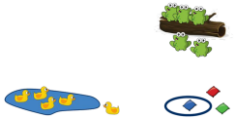
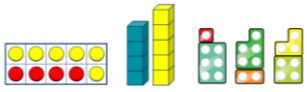
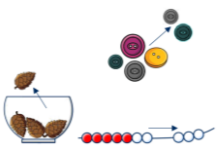
Year 6	
Progression of Skill	**Representation**
Add integers up to 10 million	  
Add decimals with up to 3 decimal places	*I do/do not need to make an exchange because …*  
Order of operations	*… has greater priority than …, so the first part of the calculation I need to do is …*   $3 \times 4 + 2 = 14$
Negative numbers	*… plus … is equal to …*  $-11 + 16 = 5$  *The difference between – 5 and −1 is 4*  *The difference between – 5 and 5 is 10*
Add fractions	*The denominator has been multiplied by …, so the numerator needs to be multiplied by …*  *The lowest common multiple of … and … is …*  $\frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$ *…is made up of … wholes and …* 

Subtraction

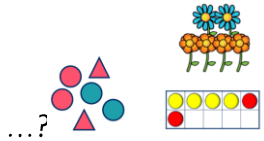
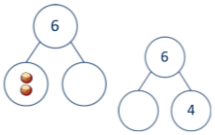
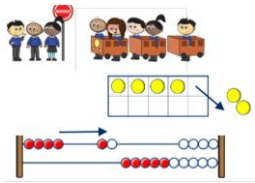
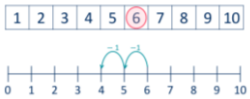
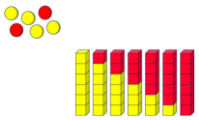
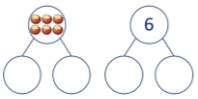
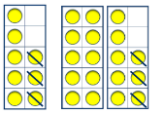
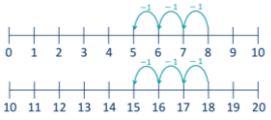
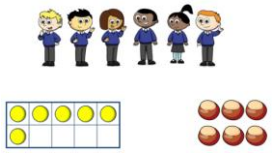
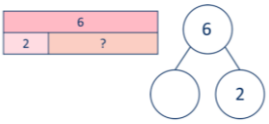
Year group	Skill
Nursery	• Subitise to 3 • Count how many • Make numbers to 5 • Take 1 away (through songs and rhymes)
Reception	• Conceptually subitise to 5 • 1 less • Notice the composition of numbers within 10 • Partition • Take away
Year 1	• Find a part • Take away • Bonds within 10 • Related facts within 20 • Missing numbers
Year 2	• 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
Year 3	• 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
Year 4	• 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
Year 5	• 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
Year 6	• Subtract integers up to 10 million • Subtract decimals with up to 3 decimal places • Order of operations • Negative numbers • Subtract fractions

Subtraction

Nursery	
Progression of Skill	**Representation**
Subitise to 3	How many do you see? 
Count how many	How many are there? Count out … from a larger group. E.g. Collect a cup for everyone at the table. 
Make numbers to 5	Show me… Begin to link numerals to quantities. 
Take 1 away	How many do we have now? 

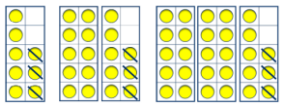
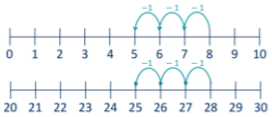
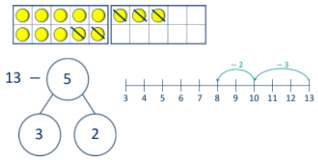
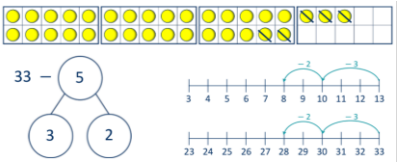
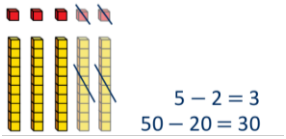
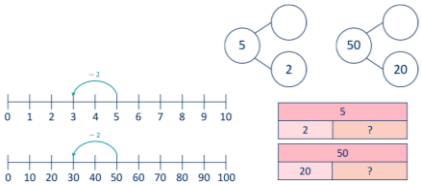
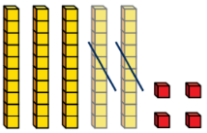
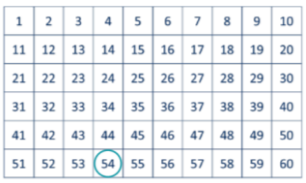
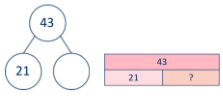
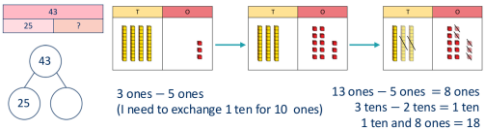
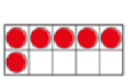
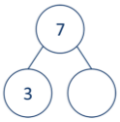
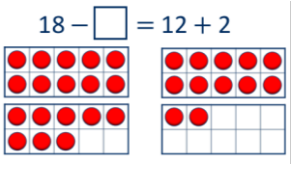
Reception		
Progression of Skill	**Representation**	
Conceptually subitise to 5	What do you see? How do you see it? 	
1 less	1 less than … is … 	
Notice the composition of numbers within 10	How many…? How many…? How many altogether? 	How many ways can you make…? 
Partition	There are … altogether. I can see … here and … there. 	… and … make … 
Take away	First… Then… Now… 	I have … I take … away Now I have … 

Subtraction

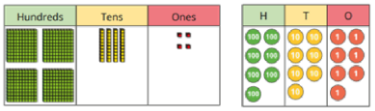
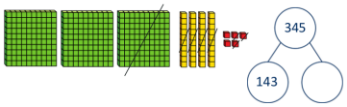
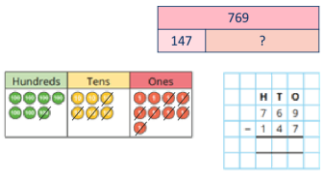
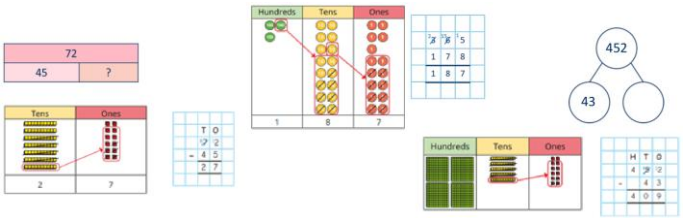
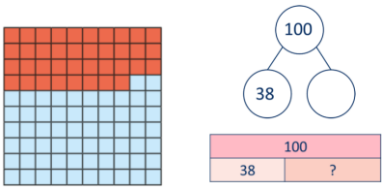
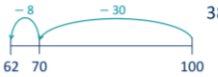
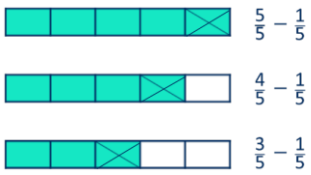
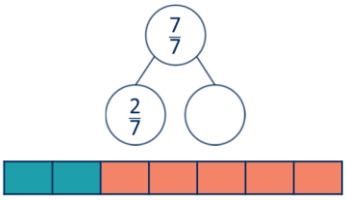
Year 1			
Progression of Skill	**Representation**		
Find a part	*There are … in total. … are … How many are not …?* 	*… is the whole. … is a part. … is a part.* 	*… subtract … is equal to … … is equal to … − …* $6-2=4$ $6-4=2$ $4=6-2$ $2=6-4$
Take away	*First… Then… Now…* 	*I start at … I jump back … I land on …* 	*… minus … is equal to …* *… is equal to … − …* $6-2=4$ $6-4=2$ $4=6-2$ $2=6-4$
Bonds within 10	*… is made of … and … … and … make …* 	*… can be partitioned into … and …* 	*… minus … is equal to …* $6-0=6$ $6-1=5$ $6-2=4$ $6-3=3$ $6-4=2$ $6-5=1$ $6-6=0$
Related facts within 20	*I know that … minus … = … so … minus … = …* 	*… less than … is … so … less than … is …* 	*What patterns do you notice?* $8-3=5$ $18-3=15$ $5=8-3$ $15=18-3$
Missing numbers	*How many do you need to subtract to make …?* 	*If … is the whole and … is a part, the other part must be…* 	*… minus … is equal to …* $6-\square=2$ $2=6-\square$ 

Subtraction

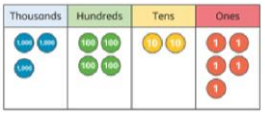
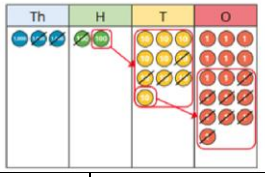
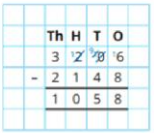
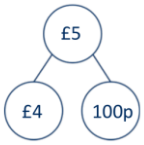
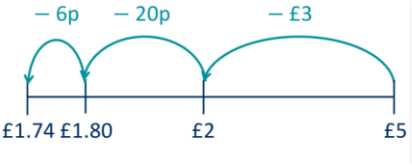
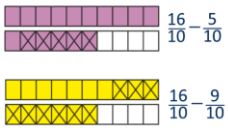
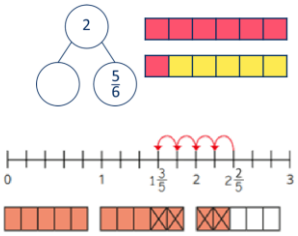
Year 2

Progression of Skill	Representation		
Subtract ones from any number (related facts)	I know that … minus … = … so … minus … = … 	… less than … is … so … less than … is … 	What do you notice? Can you continue the pattern? 8 − 3 = 5 18 − 3 = 15 28 − 3 = 25…
Subtract across a 10	… can be partitioned into … and … 	Make links with related facts. 	
Subtract multiples of 10	… ones − … ones = … ones so … tens − … tens = … tens  5 − 2 = 3 50 − 20 = 30	What is the same? What is different? 	
Subtract 10s from any number	… tens − … tens = … tens … tens and … ones = … 	To subtract … I need to subtract 10 … times. 	I know that … minus … = … so … minus … = … 50 − 20 = 30 54 − 20 = 34
Subtract two 2-digit numbers (not across a ten)	… ones − … ones = … ones … tens − … tens = … tens   3 ones − 1 one = 2 ones 4 tens − 2 tens = 2 tens 2 tens and 2 ones = 22		
Subtract two 2-digit numbers (across a ten)	I need to make an exchange because I do not have enough ones to subtract … ones.  3 ones − 5 ones (I need to exchange 1 ten for 10 ones) 13 ones − 5 ones = 8 ones 3 tens − 2 tens = 1 ten 1 ten and 8 ones = 18		
Missing numbers	How many do you need to subtract to make …?  10 − □ = 6 6 + □ = 10	If … is a whole and … is a part, then … is the other part.  7 − 3 = □ □ + 3 = 7	… can be partitioned into … and …  18 − □ = 12 + 2

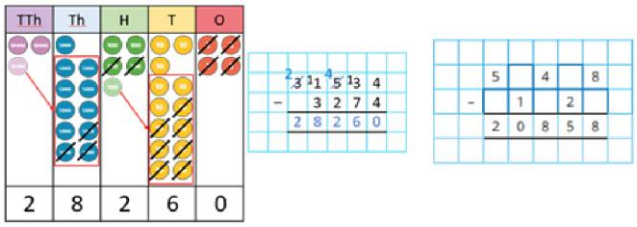
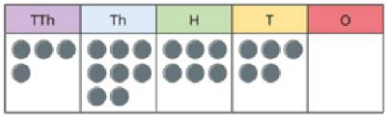
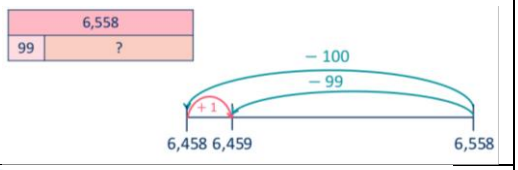
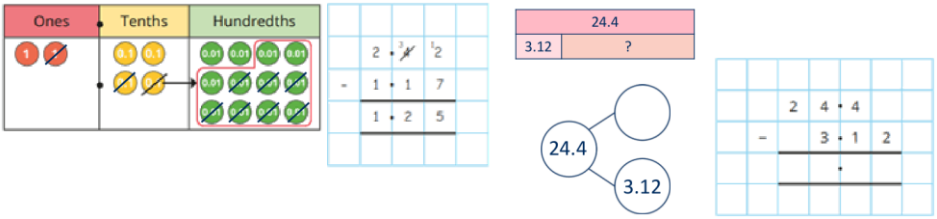
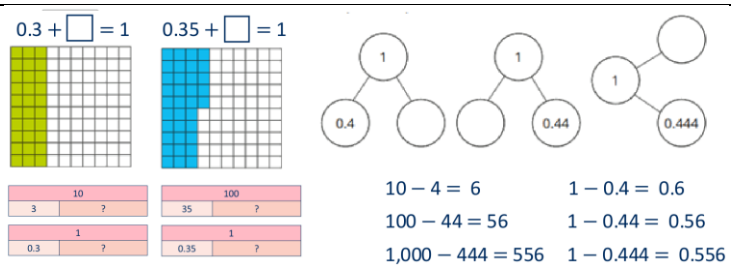
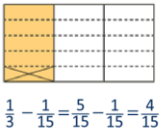
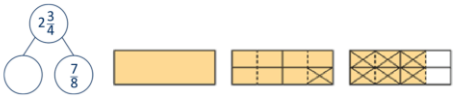
Subtraction

Year 3		
Progression of Skill	**Representation**	
Subtract 1s, 10s and 100s from a 3-digit number	*The ones/tens/hundreds column will decrease by …*  444 – 2 = 444 – 20 = 444 – 200 = 777 – 4 = 777 – 40 = 777 – 400 =	*What patterns do you notice?* 235 – 3 = 235 – 30 = 235 – 300 = 624 – 20 = 654 – 50 = 694 – 90 = 118 – ☐ = 111 181 – ☐ = 111 811 – ☐ = 111
Subtract two numbers (no exchange)	*… ones – … ones = … ones … tens – … tens = … tens … hundreds – … hundreds = … hundreds*   	
Subtract two numbers across a 10 or 100	*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 …*  	
Complements to 100	*100 minus … is equal to …*  	*I subtract … tens, then I subtract … ones.* 100 – 38 = 62 100 – 62 = 38 62 = 100 – 38 38 = 100 – 62 
Subtract fractions with the same denominator within 1 whole	*When subtracting fractions with the same denominator, I only subtract the numerator. … fifths – … fifths = … fifths*   	

Subtraction

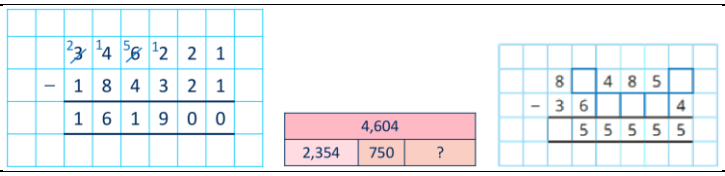
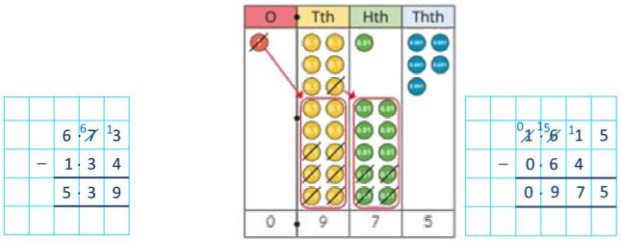
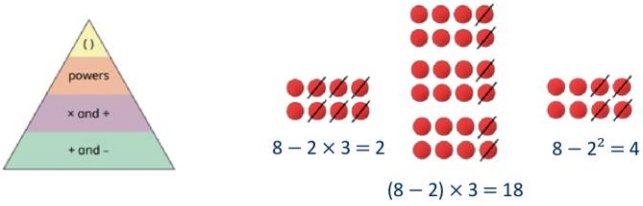
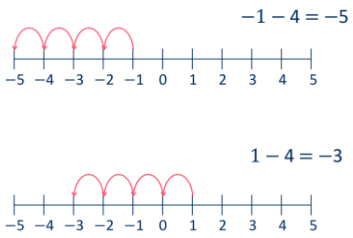
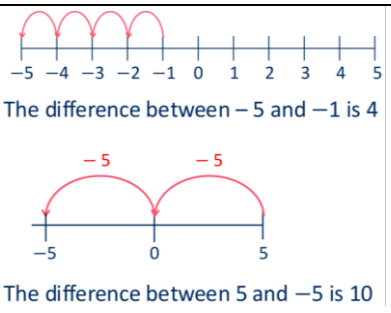
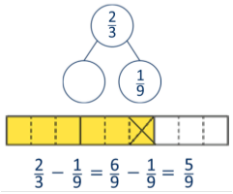
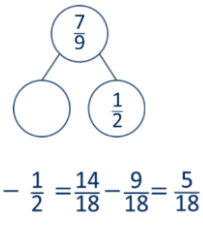
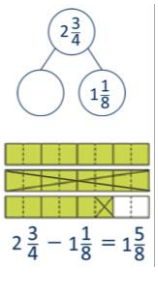
Year 4		
Progression of Skill	**Representation**	
Subtract 1s, 10s, 100s and 1,000s from a 4-digit number	*The ones/tens/hundreds/thousands column will decrease by …*  3,425 – 2 = 3,425 – 20 = 3,425 – 200 = 3,425 – 2,000 =	*What patterns do you notice?* 4,356 – 3 = 4,356 – 30 = 4,356 – 300 = 4,356 – 3,000 = 6,940 – 200 = 6,940 – 300 = 6,940 – 400 = 4,433 – ☐ = 4,430 4,433 – ☐ = 4,033 4,433 – ☐ = 4,403
Subtract up to two 4-digit numbers	*I need to subtract… ones/tens/hundreds. I do/do not need to make an exchange.* I can exchange 1… for 10…   	
Subtract decimal numbers in the context of money	*I can partition £… into £… and 100p* *£… – £… = £… 100p – …p = …p* **£5 – £3.26** £4 – £3 = £1 100p – 26p = 74p £5 - £3.26 = £1.74  	*£3.26 can be partitioned into £3 + 20p + 6p* 
Subtract fractions and mixed numbers with the same denominator	*When subtracting fractions with the same denominator, I only subtract the numerator. … tenths – … tenths = … tenths*   	

Subtraction

Year 5	
Progression of Skill	**Representation**
Subtract whole numbers with more than 4 digits	*I can exchange 1 … for 10 …* 
Subtract using mental strategies	 48,650 − 300 = 48,650 − 30,000 = 48,650 − 30 = *To subtract …, I can subtract … then add …* 
Subtract decimals with up to 2 decimal places	
Complements to 1	
Subtract fractions with denominators that are a multiple of one another	*The denominator has been multiplied by …, so the numerator needs to be multiplied by… for the fractions to be equivalent.*  $\frac{1}{3}-\frac{1}{15}=\frac{5}{15}-\frac{1}{15}=\frac{4}{15}$  $\frac{2}{3}-\frac{2}{9}=\frac{6}{9}-\frac{2}{9}=\frac{4}{9}$ 

Subtraction

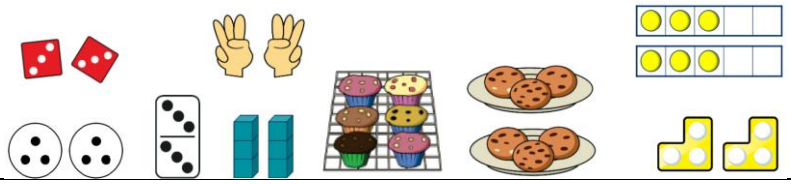
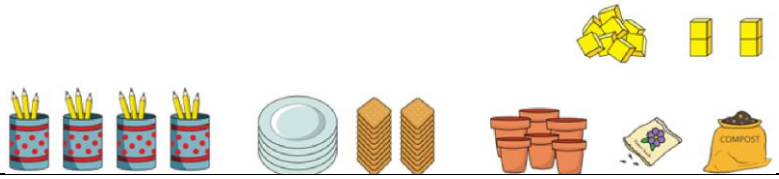
Year 6

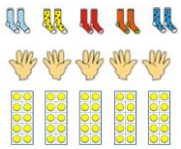
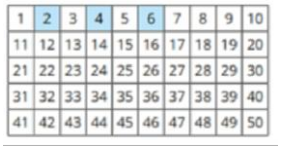
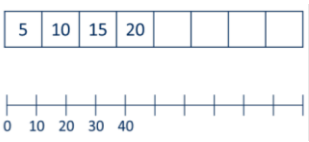
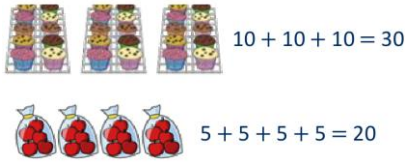
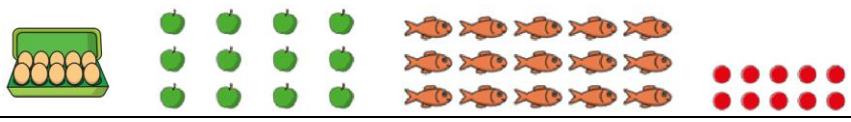
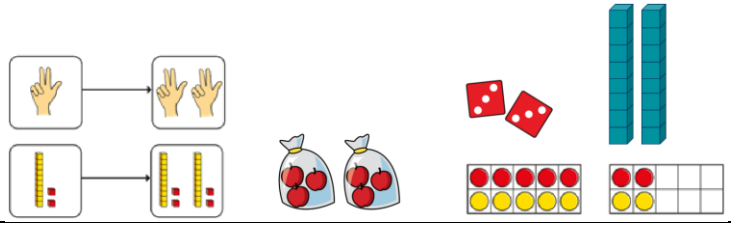
Progression of Skill	Representation
Subtract integers up to 10 million	
Subtract decimals with up to 3 decimal places	I do/do not need to make an exchange because ... 
Order of operations	...has greater priority than..., so the first part of the calculation I need to do is... 
Negative numbers	... minus ... is equal to ...  
Subtract fractions	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 ... 

Multiplication

Year group	Skill
Nursery	• Continue with counting and subitising skills as a foundation for later work on equal groups. (see addition and subtraction sections)
Reception	• Double to 10 • Make equal groups
Year 1	• Count in 2s, 5s and 10s • Add equal groups • Make arrays • Make doubles
Year 2	• Link repeated addition and multiplication • Use arrays • Double • The 2 times-table, 5 times-table and 10 times-table • Missing numbers
Year 3	• The 3 times-table, 4 times-table and 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
Year 4	• 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
Year 5	• Multiples and factors • Square and cube numbers • Multiply numbers up to 4 digits by a 1-digit number and 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
Year 6	• 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

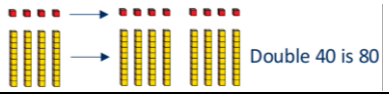
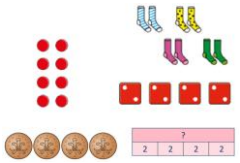
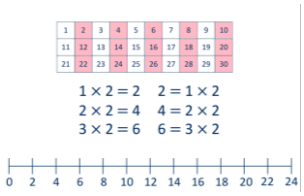
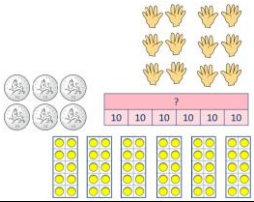
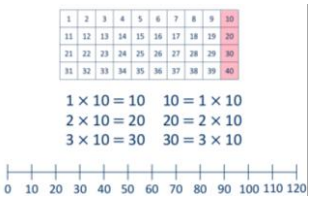
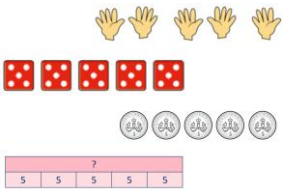
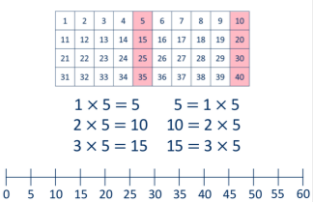
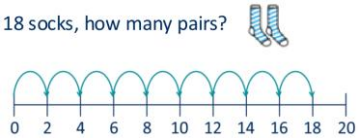
Multiplication

Reception	
Progression of Skill	**Representation**
Double to 10	Double … is … … is double … 
Make equal groups	There are … groups of … There are … altogether. 

Year 1			
Progression of Skill	**Representation**		
Count in 2s, 5s and 10s	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. 
Add equal groups (repeated addition)	There are … groups of … There are … altogether. 	What is the same? What is different? 2 + 2 + 2 = 5 + 5 + 5 = 10 + 10 + 10 = Use objects or a drawing to represent the equal groups and find how many in total.	
Make arrays	There are … rows of … There are … altogether. There are … columns of … There are … altogether. 		
Make doubles	Double … is … … + … = … 		

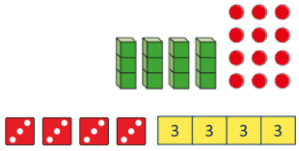
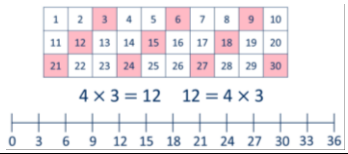
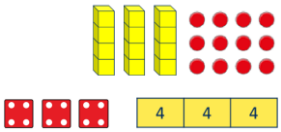
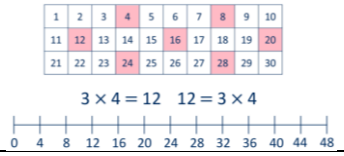
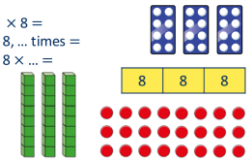
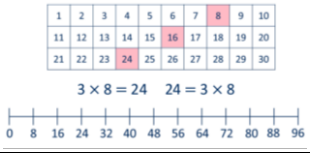
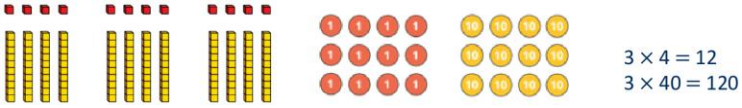
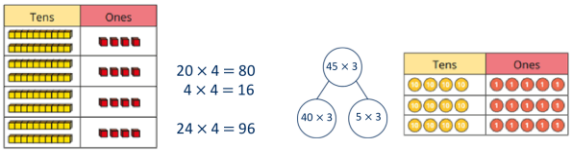
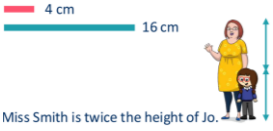
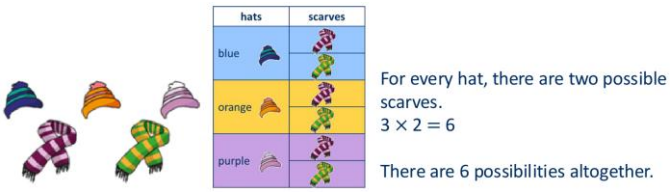
Multiplication

Year 2

Progression of Skill	Representation	
Link repeated addition and multiplication	There are … equal groups with … in each group. There are … altogether.  $3+3=6$ $2\times3=6$  $5+5+5+5=20$ $4\times5=20$	
Use arrays	There are … rows with … in each row. There are … columns with … in each column.  3 lots of 5 = 15 5 + 5 + 5 = 15 5 lots of 3 = 15 3 + 3 + 3 + 3 + 3 = 15	I can see … × … and … ×… $3\times5=15$ $5\times3=15$ $3\times5=5\times3$
Double	Double … is …  Double 4 = 4 + 4 Double 4 is 8	Double … is … so double … is … Double 4 is 8  Double 40 is 80
The 2 times-table	… groups of 2 = … × 2 = … 	… times 2 is equal to …  1 × 2 = 2 2 = 1 × 2 2 × 2 = 4 4 = 2 × 2 3 × 2 = 6 6 = 3 × 2 0 2 4 6 8 10 12 14 16 18 20 22 24
The 10 times-table	… groups of 10 = … × 10 = … 	… times 10 is equal to …  1 × 10 = 10 10 = 1 × 10 2 × 10 = 20 20 = 2 × 10 3 × 10 = 30 30 = 3 × 10 0 10 20 30 40 50 60 70 80 90 100 110 120
The 5 times-table	… groups of 5 = … × 5 = … 	… times 5 is equal to …  1 × 5 = 5 5 = 1 × 5 2 × 5 = 10 10 = 2 × 5 3 × 5 = 15 15 = 3 × 5 0 5 10 15 20 25 30 35 40 45 50 55 60
Missing numbers	… is equal to … groups of …  18 socks, how many pairs? 0 2 4 6 8 10 12 14 16 18 20	… times … is equal to … $\square\times2=18$ $18=2\times\square$

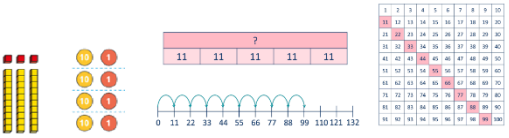
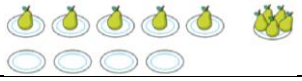
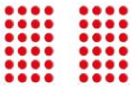
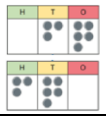
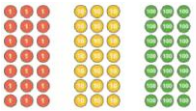
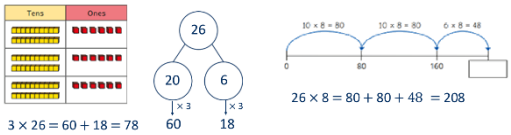
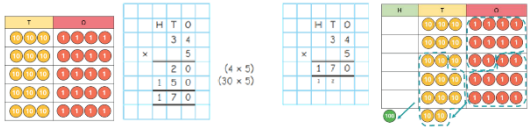
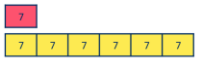
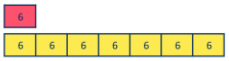
Multiplication

Year 3

Progression of Skill	Representation	
The 3 times-table	… groups of 3 = … × 3 = … 	… times 3 is equal to … 
The 4 times-table	… groups of 4 = … × 4 = … 	… times 4 is equal to … 
The 8 times-table	… groups of 8 = … × 8 = … 	… times 8 is equal to … 
Related facts	… × … ones is equal to … ones so … × … tens is equal to … tens. 	
Multiply a 2-digit number by a 1-digit number - no exchange	… tens multiplied by … is equal to … tens. …ones multiplied by … is equal to … ones. 	
Multiply a 2-digit number by a 1-digit number - with exchange	… tens multiplied by … is equal to … tens. … ones multiplied by … is equal to … ones. 	
Scaling	There are …. times as many … as … 	… is … times the size of … … is … times the length/height of … 
Correspondence problems (How many ways?)	For every … , there are … possible … There are … × … possibilities altogether. 	

Multiplication

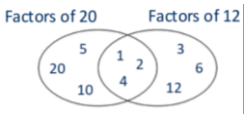
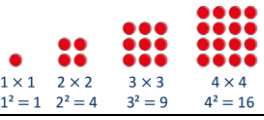
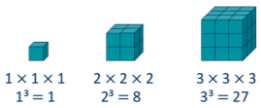
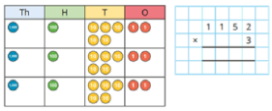
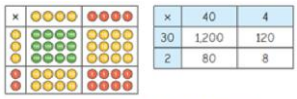
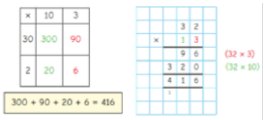
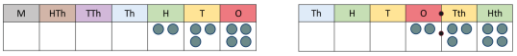
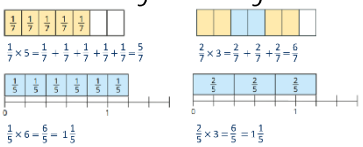
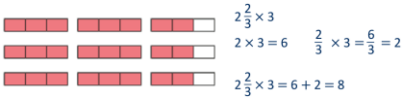
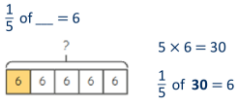
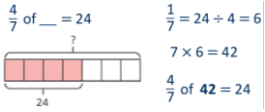
Year 4

Progression of Skill	Representation
Times-table facts to 12 × 12	… groups of … = … … times … is equal to … … × … = … 
Multiply by 1 and 0	Any number multiplied by 1 is equal to …  Any number multiplied by 0 is equal to … … × … = … 1 × 1 = 1 1 × 0 = 0 2 × 1 = 2 2 × 0 = 0 3 × 1 = 3 3 × 0 = 0 4 × 1 = 4 4 × 0 = 0
Multiply 3 numbers	To work out … × … × …, I can first calculate … × … and then multiply the answer by …  4 × 2 × 3 = 8 × 3 = 24 2 × 3 × 4 = 6 × 4 = 24 3 × 4 × 2 = 12 × 2 = 24
Factor pairs	12 = … × … , so … × 12 = …× … × …  8 × 6 = 8 × 3 × 2 8 × 6 = 24 × 2  6 × 8 = 6 × 4 × 2 6 × 8 = 24 × 2
Multiply by 10 and 100	When I multiply by 10, the digits move … place value column to the left. … is 10 times the size of …  35 × 10 = 350 When I multiply by 100, the digits move … place value columns to the left. … is 100 times the size of …  14 × 100 = 1,400
Related facts	… × … ones is equal to … ones so … × … tens is equal to … tens and … × … hundreds is equal to … hundreds.  3 × 7 = 21 3 × 70 = 210 3 × 700 = 2,100 7 × 3 = 21 7 × 30 = 210 7 × 300 = 2,100
Mental strategies	… tens multiplied by … is equal to … tens. …ones multiplied by … is equal to … ones.  3 × 26 = 60 + 18 = 78 26 20 × 3 = 60 6 × 3 = 18 10 × 8 = 80 10 × 8 = 80 6 × 8 = 48 0 80 160 26 × 8 = 80 + 80 + 48 = 208
Multiply a 2 or 3-digit number by a 1-digit number	To multiply a 2-digit number by … , I multiply the ones by … and the tens by … To multiply a 3-digit number by … , I multiply the ones by … , the tens by … and the hundreds by …  (4 × 5) (30 × 5)
Scaling	… is … times the size of …  A computer mouse costs £7 A keyboard costs 6 times as much.  A red ribbon is 6 cm. A yellow ribbon is 7 times as long.
Correspondence problems	For every … , there are … possibilities. There are … × … possibilities altogether. A pizza company offers a choice of 5 toppings and 3 bases. 5 × 3 = 15

	Deep pan	Italian	Thin
Cheese	C DP	C I	C Th
Mushroom	M DP	M I	M Th
Vegetable	V DP	V I	V Th
Chicken	C DP	C I	C Th
Tuna	T DP	T I	T Th

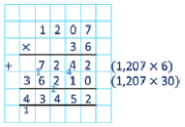
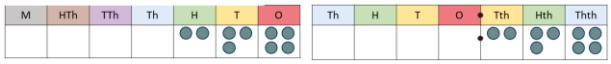
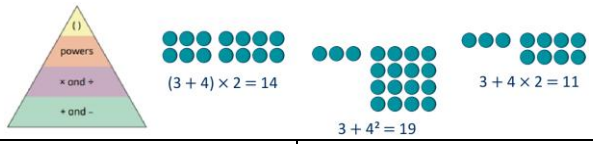
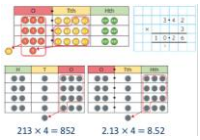
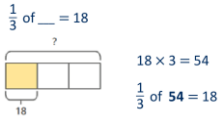
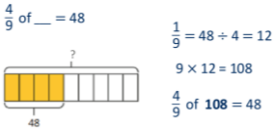
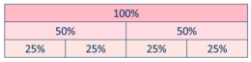
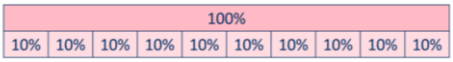
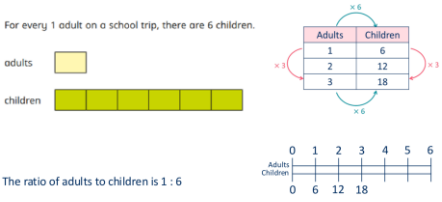
Multiplication

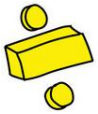
Year 5

Progression of Skill	Representation		
Multiples and factors	… is a multiple of … because … × … = … 	… is a factor of … because … × … = … 	The common factors of … and … are … 
Square and cube numbers	… squared means … × … 	… cubed means … × … × … 	
Multiply numbers up to 4 digits by a 1-digit number	To multiply a 4-digit number by … , I multiply the ones by … , the tens by … , the hundreds by … and the thousands by … 		
Multiply numbers up to 4 digits by a 2-digit number	I can partition … into … and … 	First, I multiply by the … Then I multiply by the … 	
Multiply by 10, 100 and 1,000	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 … 		
Mental strategies	The most efficient strategy to calculate … × … is … To calculate … × 12, I can do … × … × …		
Multiply fractions by a whole number	To multiply a fraction by an integer, I multiply the numerator by the integer and the denominator remains the same. 		
Multiply mixed numbers by a whole number	I can partition … into … and … 		
Find the whole	If one part is …, then the whole is … × … 	If several parts are …, first find one part, then multiply to find the whole. 	

Multiplication

Year 6

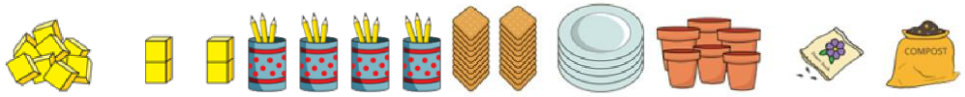
Progression of Skill	Representation
Multiply numbers up to 4 digits by a 2-digit number	To multiply by a 2-digit number, first multiply by the ones, then multiply by the tens and then find the total. 
Multiply by 10, 100 and 1,000	To multiply by 10/100/1,000, I move all the digits … places to the left. … is 10/100/1,000 times the size of …  234 × 10 = 2,340 234 × 100 = 23,400 234 × 1,000 = 234,000 0.234 × 10 = 2.34 0.234 × 100 = 23.4 0.234 × 1,000 = 234
Order of operations	… has greater priority than …, so the first part of the calculation I need to do is …  (3 + 4) × 2 = 14 3 + 4² = 19 3 + 4 × 2 = 11
Multiply decimals by integers	I know that …× … = …, so I also know that …× … = …  6 × 2 = 12 6 × 0.2 = 1.2
	I need to exchange 10 … for 1 … 
Multiply fractions by fractions	When multiplying a pair of fractions, I need to multiply the numerator and multiply the denominator.  $\frac{1}{3}\times\frac{1}{5}=\frac{1}{15}$ $\frac{2}{3}\times\frac{4}{5}=\frac{8}{15}$ $\frac{2}{3}\times\frac{3}{5}=\frac{6}{15}=\frac{2}{5}$
Find the whole	If one part is …, then the whole is … × … 
	If several parts are …, first find one part, then multiply to find the whole. 
Calculate percentages	There are … lots of … % in 100% To find … %, I need to divide by …  50% of … = …÷ 2 25% of … = …÷ 4
	… % is made up of … %, and … %  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%
Calculations involving ratio	For every … , there are … 

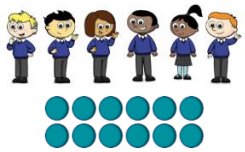
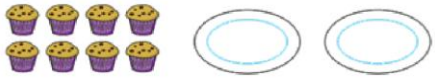
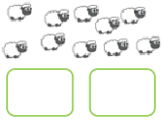
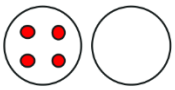
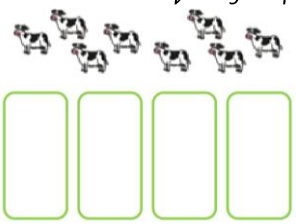
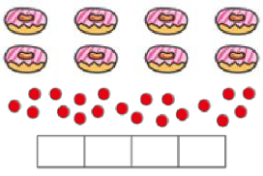
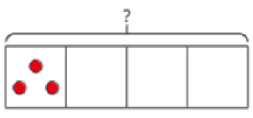


Division

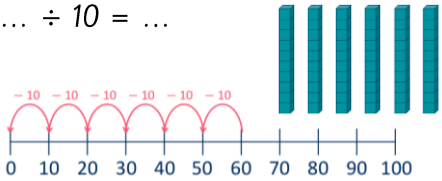
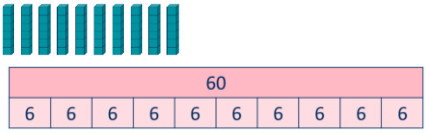
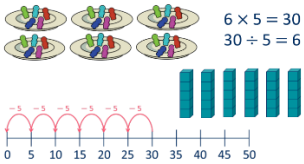
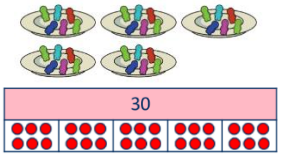
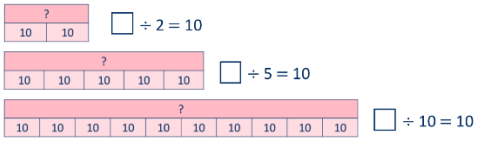
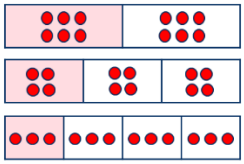
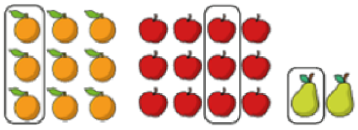
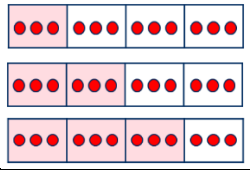
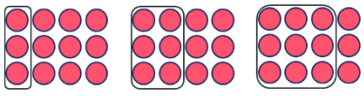
Year group	Skill
Nursery	• Continue with counting and subitising skills as a foundation for later work on equal groups. (see addition and subtraction sections)
Reception	• Sharing • Grouping
Year 1	• Make equal groups – grouping • Make equal groups – sharing • Find a half • Find a quarter
Year 2	• Divide by 2, 5 and 10 • Missing numbers • Unit fractions • Non-unit fractions
Year 3	• Divide by 3, 4 and 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
Year 4	• 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
Year 5	• Mental strategies • Divide numbers up to 4 digits by a 1-digit number • Divide by 10, 100 and 1,000 • Fraction of an amount
Year 6	• 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

Division

Reception	
Progression of Skill	**Representation**
Sharing	There are … altogether. They are shared equally between … groups. 
Grouping	There are … groups of … There are … altogether. 

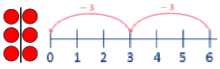
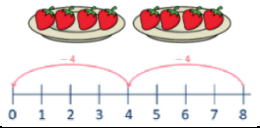
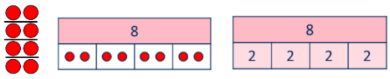
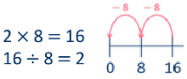
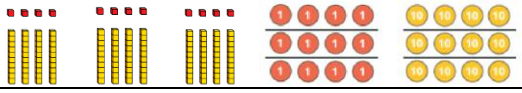
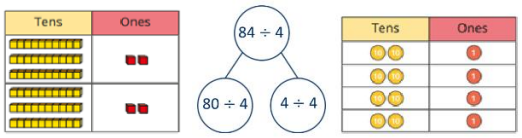
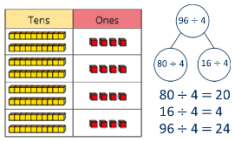
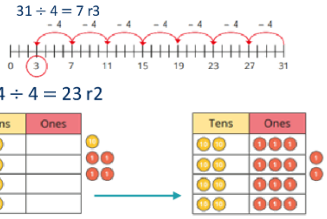
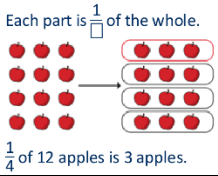
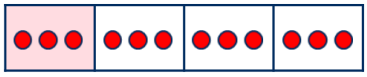
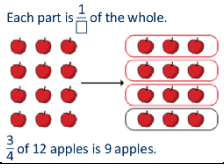
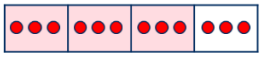
Year 1			
Progression of Skill	**Representation**		
Make equal groups – grouping	There are … altogether. How many groups of … can you make? 	Circle groups of 2 There are … groups of 2 	Take … cubes. Make equal groups.  There are … groups of …
Make equal groups – sharing	… have been shared equally between… There are … on/in each … 	Take … cubes. Share them between …  12 shared between … is …	
Find a half	To find half, I need to share into 2 equal groups.  There are … in each group.	Half of … is … 	If … is half, what is the whole?  4 is half of …
Find a quarter	To find a quarter, I need to share into 4 equal groups.  There are … in each group.	A quarter of … is … 	If … is half, what is the whole?  If … is one quarter, what is the whole? 3 is one quarter of …

Division

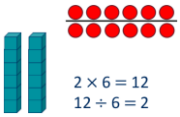
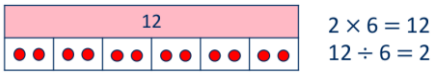
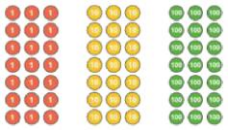
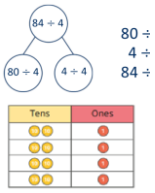
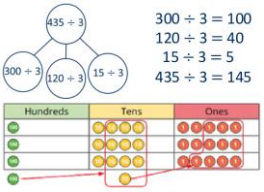
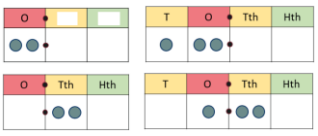
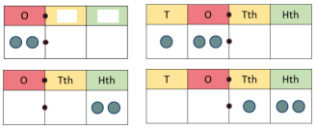
Year 2		
Progression of Skill	**Representation**	
Divide by 2	*There are … equal groups of 2* *… ÷ 2 = …* 	*…shared equally between 2 is…* *Half of… is…* *… ÷ 2 = …* 
Divide by 10	*There are … equal groups of 10* *… ÷ 10 = …*  	*…shared equally between 10 is…* *… ÷ 10 = …* 
Divide by 5	*There are … equal groups of* *… ÷ 5 = …*  	*…shared equally between 5 is…* *… ÷ 5 = …* 
Missing numbers	*… divided by 2/5/10 is equal to …*  	
Unit fractions	*The objects have been shared fairly into … groups.* 	*There are … equal parts.* *There is … part circled.* 
Non-unit fractions	*The objects have been shared fairly into … groups.* 	*There are … equal parts.* *There is … part circled.* 

Division

Year 3

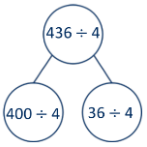
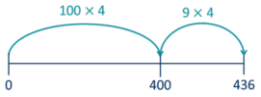
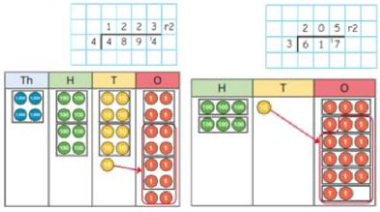
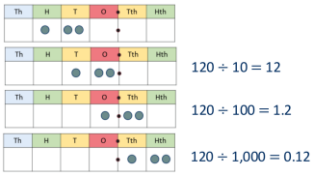
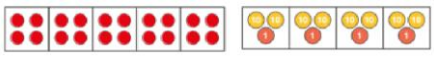
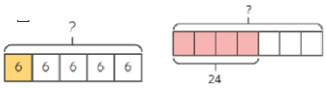
Progression of Skill	Representation	
Divide by 3	There are … groups of 3 in … … ÷ 3 = 	… has been shared equally into 3 equal groups. … ÷ 3 = 
Divide by 4	There are … groups of 4 in … … ÷ 4 = 	… has been shared equally into 4 equal groups. … ÷ 4 = 
Divide by 8	There are … groups of 8 in … … ÷ 8 = 	… has been shared equally into 8 equal groups. … ÷ 8 = 
Related facts	… ÷ … is equal to …, so … tens ÷ … is equal to … tens. 	
Divide a 2-digit number by a 1-digit number - no exchange	… tens divided by … is equal to … tens. … ones divided by … is equal to … ones. 	
Divide a 2-digit number by a 1-digit number - with remainders	… tens divided by … is equal to … tens.  80 ÷ 4 = 20 16 ÷ 4 = 4 96 ÷ 4 = 24 … ones divided by … is equal to … ones.	There are … groups of … There are … remaining. 
Unit fractions of a set of objects	The whole is divided into … equal parts.  $\frac{1}{4}$ of 12 apples is 3 apples.	One … of … is … $\frac{1}{4}$ of 12 is 3 
Non-unit fractions of a set of objects	The whole is divided into … equal parts.  $\frac{3}{4}$ of 12 apples is 9 apples.	$\frac{2}{3}$ of 36 is 24  $\frac{3}{4}$ of 12 is 9 

Division

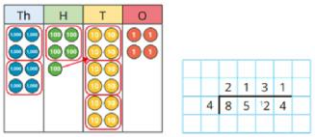
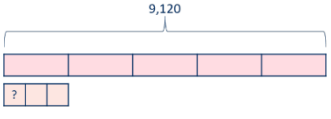
Year 4		
Progression of Skill	**Representation**	
Division facts to 12 × 12	*There are.. groups of…in…* *…÷… =*  	*… has been shared equally into…* *equal groups.* *…÷… =*  
Divide a number by 1 and itself	*When I divide a number by 1, the number remains the same.* *5 shared between 1 is 5*   *There are 5 groups of 1 in 5*	*When I divide a number by itself, the answer is 1* *5 shared between 5 is 1*  *There is 1 group of 5 in 5* 
Related facts	*… ÷ … is equal to …* *so … tens ÷ … is equal to … tens* *and … hundreds ÷ … is equal to … hundreds.*  21 ÷ 7 = 3 210 ÷ 7 = 30 2,100 ÷ 7 = 300 21 ÷ 3 = 7 210 ÷ 3 = 70 2,100 ÷ 3 = 700	
Divide a 2 or 3-digit number by a 1-digit number	*I can partition … into … tens and … ones.*  	*I cannot share the hundreds/tens equally, so I need to exchange 1 … for 10 …* 
Divide by 10 and 100	*When I divide by 10, the digits move 1 place value column to the right.* *… is one-tenth the size of …*  	*When I divide by 100, the digits move 2 place value columns to the right.* *… is one-hundredth the size of …* 

Division

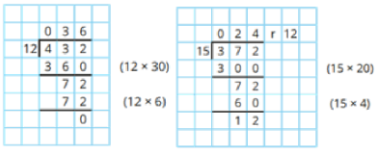
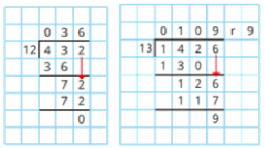
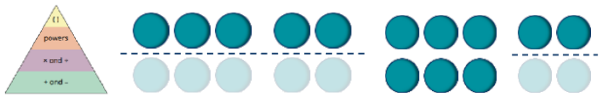
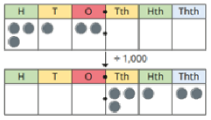
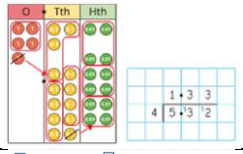
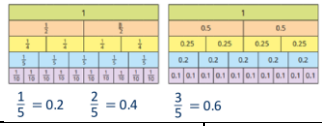
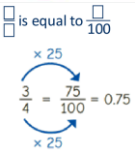
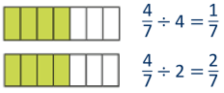
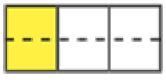
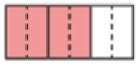
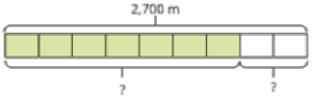
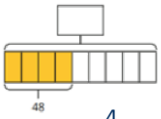
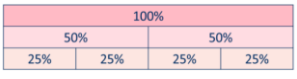
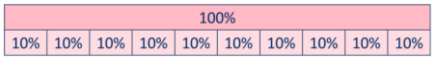
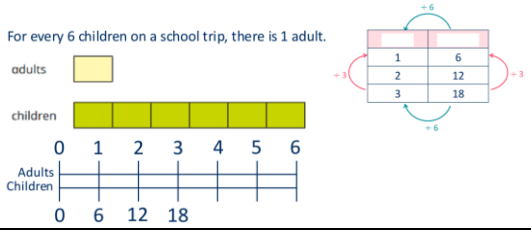
Year 5

Progression of Skill	Representation		
Mental Strategies	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 … Use factors of the divisor. 436 ÷ 4 = 436 ÷ 2 ÷ 2 436 ÷ 4 = 218 218 ÷ 2 = 109
Divide numbers up to 4 digits by a 1-digit number	There are … groups of … hundreds/tens/ones/ in … I can exchange 1 … for 10 …  		
Divide by 10, 100 and 1,000	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 …  		
Fraction	To find a fraction of an amount, divide by the denominator and multiply by the numerator. 1/5 of 20 = 20 ÷ 5 = 4 3/5 of 20 = 4 × 3 = 12 		If 1/5 is 6, then the whole is 6 × 5 = 30. If 4/7 is 24, one part is 24 ÷ 4 = 6 and the whole is 6 × 7 = 42. Use a bar model to find one part first. 

Year 6

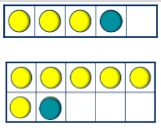
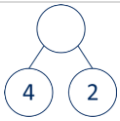
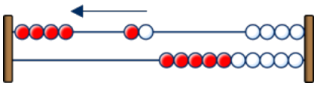
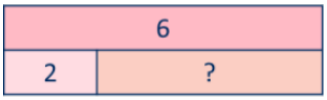
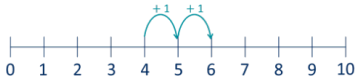
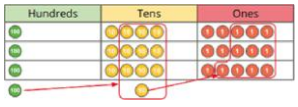
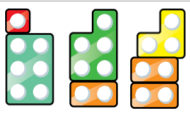
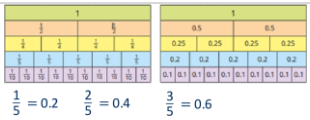
Progression of Skill	Representation
Short division	There are … groups of … hundreds/tens/ones/ in … I can exchange 1 … for 10 … 
Mental strategies	To divide by … , I can first divide by … and then divide the answer by … 240 ÷ 60 = 240 ÷ 10 ÷ 6 240 → ÷ 10 → □ → ÷ 6 → □ 480 ÷ 24 = 480 ÷ 4 ÷ 6 480 → ÷ 4 → □ → ÷ 6 → □ 9,120 ÷ 15 = 9,120 ÷ 5 ÷ 3 

Division

Long division	Method 1  	Method 2 
Order of operations	… has greater priority than …, so the first part of the calculation I need to do is … 	
Divide by 10, 100 and 1,000	To divide by … , I move the digits … places to the right. 312 ÷ 10 = 31.2 312 ÷ 100 = 3.12 312 ÷ 1,000 = 0.312 906 ÷ 10 = 90.6 906 ÷ 100 = 9.06 906 ÷ 1,000 = 0.906  	
Divide decimals by integers	I know that …÷ … = … So I also know that … ÷… = … 	I need to exchange 1 … for 10 … 
Decimal and fraction equivalents	The fraction … is equivalent to the decimal …  	
Divide a fraction by an integer	… ones divided by 2 is … ones so … sevenths divided by 2 is … sevenths.  	I am dividing by … , so I can split each part into … equal parts.  1/3 ÷ 2 = 1/6	… is equivalent to … so … ÷ … = … ÷ … 
Fraction of an amount	To find 1/… I divide by … To find …/… I then multiply by … 7/9 of 2,700 = 2,700 ÷ 9 × 7 = 2,100  7/9 of 2,700 = 1/9 of 2,700 × 7	If 4/9 is 48, one ninth is 48 ÷ 4 = 12. The whole is 12 × 9 = 108. Find one equal part before finding the whole.  4/9 of __ = 48
Calculate percentages	There are … lots of … % in 100% To find … %, I need to divide by …  	… % is made up of … %, and … %  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%
Calculations involving ratio	For every … , there are …  	

Mathematical representations glossary

These resources and diagrams help children see mathematical relationships and explain their thinking. They connect practical experiences and pictures with written numbers and calculations.

Representation		Description and purpose
Five and ten frames		*Grids with five or ten spaces, filled with counters to represent numbers. They help children recognise quantities, see number bonds and calculate by making five or ten.*
Part-whole models		*Diagrams showing how a whole is made from two or more parts. They support partitioning, number bonds, addition and subtraction, including finding a missing part.*
Rekenreks		*Bead frames, commonly with two rows of ten beads. Each row has five beads of one colour and five of another. Children move beads in groups to explore numbers, addition and subtraction.*
Bar models		*Rectangular bars representing quantities and their relationships. They help children interpret problems involving parts and wholes, comparisons, equal groups, fractions and ratio.*
Number lines		*Lines showing numbers in order. Labelled intervals or jumps help children compare numbers, calculate, find differences and explore fractions, decimals and negative numbers.*
Number tracks		*Sequences of numbered boxes, with one number in each box. They support counting forwards and backwards and finding one more or one less.*
Bead strings		*Strings of beads, often arranged in colour groups of five or ten. Moving or grouping the beads supports counting, number bonds and calculation.*
Base ten equipment		*Blocks whose sizes show place value: ones, tens, hundreds and thousands. They support partitioning and exchanging, for example swapping ten ones for one ten.*
Place value counters and charts		*Labelled counters represent values such as one, ten or one hundred. Charts organise digits or counters into place value columns and support understanding of exchanges and calculation.*
Arrays		*Objects arranged in equal rows and columns. They show equal groups and help children understand multiplication, division and the relationship between multiplication facts.*
Number shapes		*Shapes with holes arranged to represent different numbers. Their patterns help children recognise quantities, compare numbers, combine parts and explore odd and even numbers.*
Fraction strips and walls		*Strips divided into equal parts, arranged to compare fractions of the same whole. They help children recognise equivalent fractions and understand fraction calculations.*