Primary maths

Calculation policy

Updated September 2024

White Rose MATHS

Guidance for teachers

White Rose MATHS
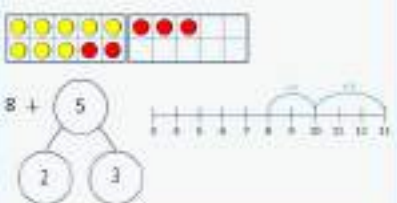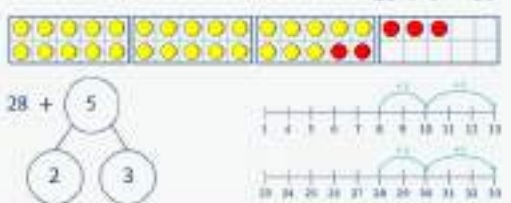
The calculation policy is divided into four sections: addition, subtraction, multiplication and division. At the start of each section, you will find an overview of the progression of skills. Calculations involving decimal numbers and fractions are included.

The calculation policy follows the same concrete, pictorial, abstract approach as our main schemes of learning. Where appropriate, sentence stems and key questions are included alongside the key representations.

Where skills are divided into more than one section across the page, there is a progression in the level of difficulty from left to right.
For example, when adding across a 10, children need to be able to add across 10 itself, before making links with related facts.

Progression of skills - Addition

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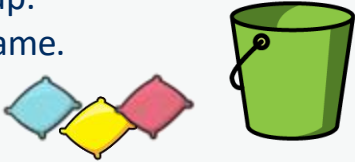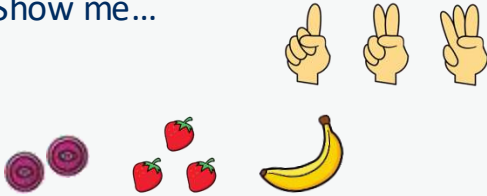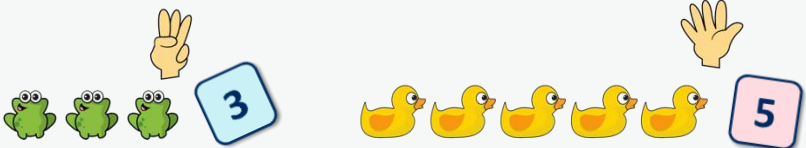| Year group	Skill
Nursery	• Subitise to 3 • Count how many • Make numbers to 5 • Add 1 more (through songs and rhymes)
Reception	• Conceptually subitise to 5 • 1 more • Notice the composition of numbers within 10 • Combine 2 groups • Add more
Year 1	• Add together • Add more • Bonds within 10 • Related facts within 20 • Missing numbers

Progression of skills - Addition

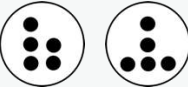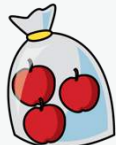| Year group	Skill
Year 2	• Add 1s to any number (related facts) • Add three 1-digit numbers • Add across a 10 • Add multiples of 10 • Add 10s to any number • Add two 2-digit numbers (not across a ten) • Add two 2-digit numbers (across a ten) • Missing numbers
Year 3	• Add 1s, 10s and 100s to a 3-digit 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

Progression of skills - Addition

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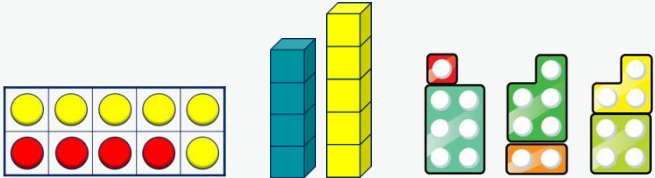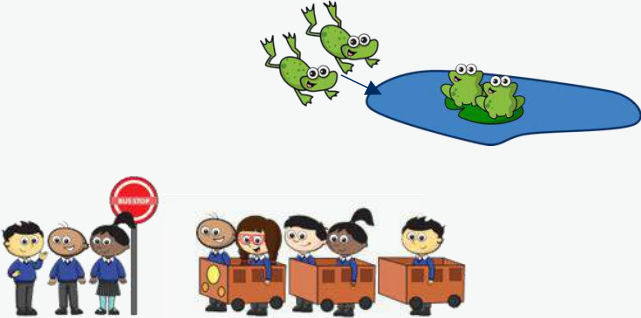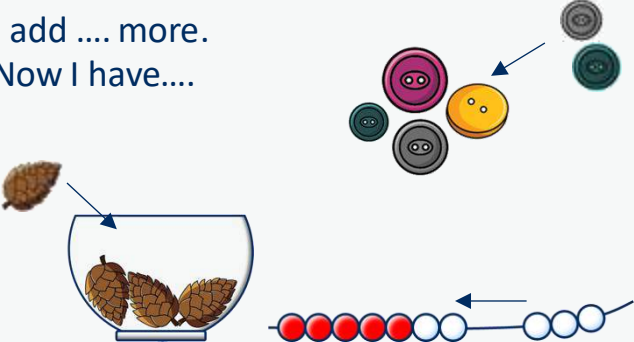| Year group	Skill
Year 4	• Add 1s, 10s and 100s to a 4-digit number • Add up to two 4-digit numbers • Add decimal numbers in the context of money • Add fractions and mixed numbers with the same denominator beyond 1 whole
Year 5	• Add using mental strategies • Add whole numbers with more than 4 digits • 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	• Begin to have an understanding of numbers to 5 • We recommend focusing on noticing and representing small quantities, perceptual subitising and counting.

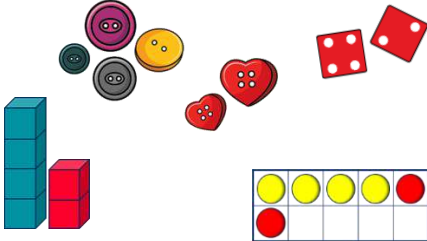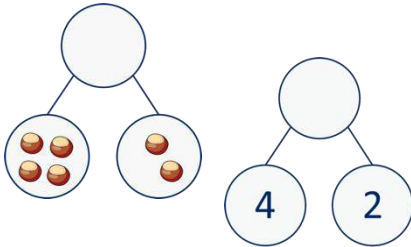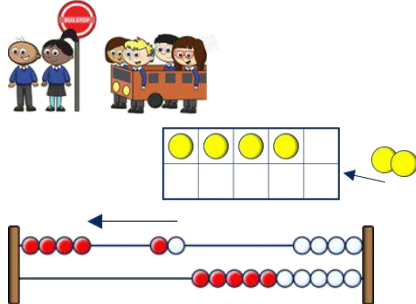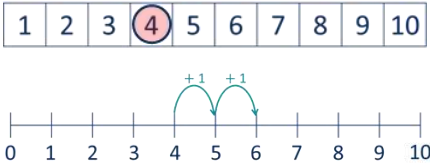| Progression of skills	Key representations	
Subitise to 3 Instantly see how many.	How many do you see?	
Count how many Begin to count objects using 1-1 correspondence.	How many are there? 1　2　3　4　5	Count out … from a larger group. E.g. Collect 3 beanbags for a game.
Make numbers to 5 Start by showing 1, 2 and 3 using fingers.	Show me…	Begin to link numerals to quantities.
Add 1 more Through stories, songs and rhymes.	How many do I have now?	

Addition

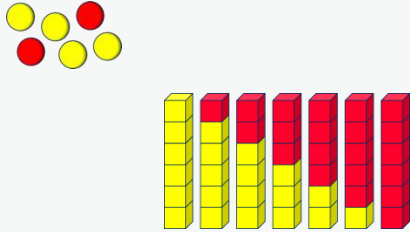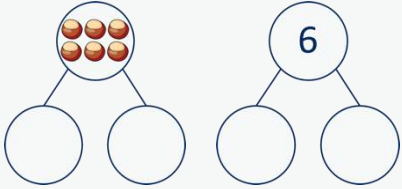| Reception	• Have a deep understanding of numbers to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5 • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts.
Progression of skills	**Key representations**
Conceptually subitise to 5 Notice the parts that make up the whole.	What do you see? How do you see it?
1 more Continue to link to stories, songs and rhymes.	1 more than … is …
Notice the composition of numbers within 10 Link to stories, songs and rhymes.	How many…? How many…? How many altogether?

How many ways can you make…?
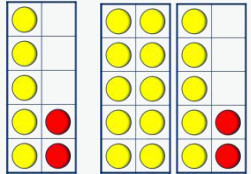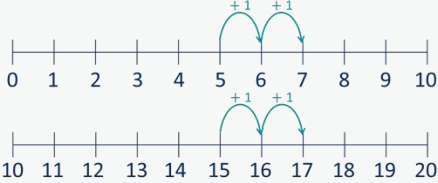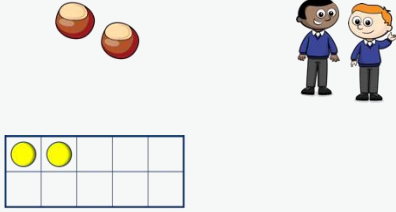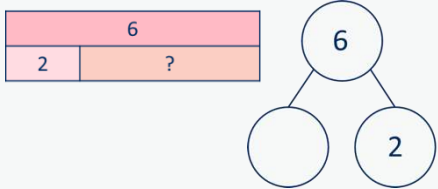
Addition
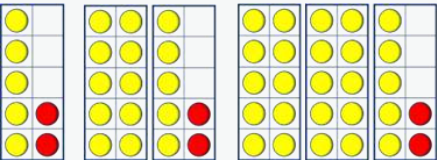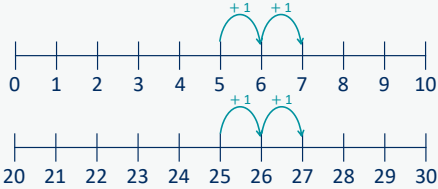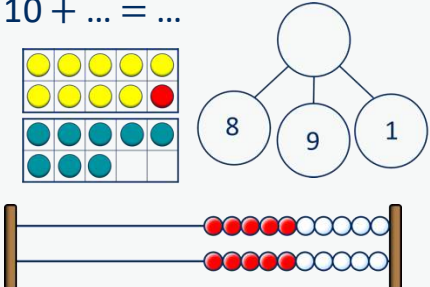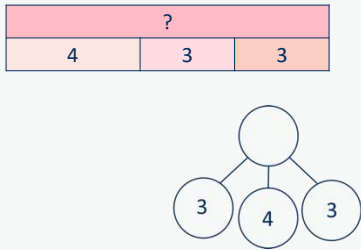
Progression of skills	Key representations	
Combine 2 groups 2 groups are combined to find the total.	There are …. There are …. There are …. altogether.	…. and …. make ….
Add more A quantity is increased.	First… Then…. Now….	I have …. I add …. more. Now I have….

Addition
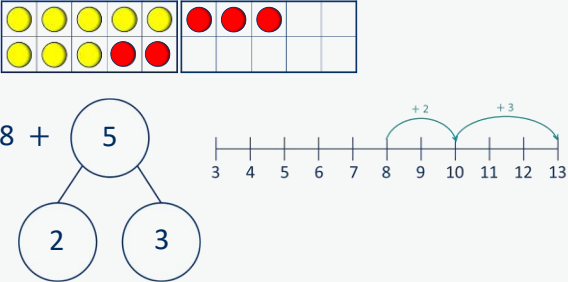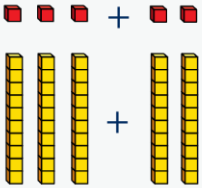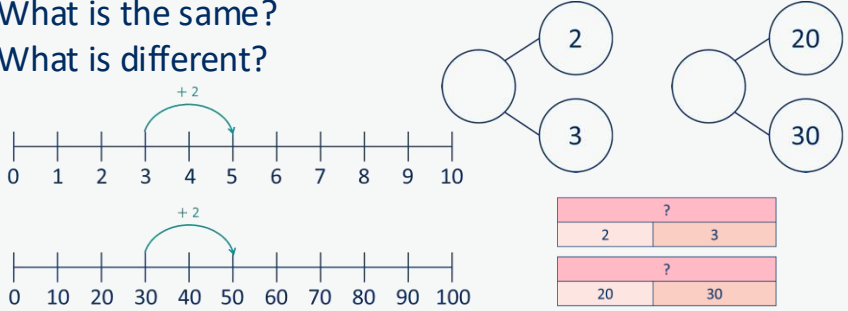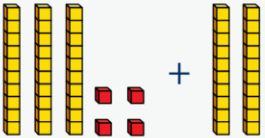
Year 1	• Read, write and interpret mathematical statements involving addition (+) and equals (=) signs. • Represent and use number bonds within 20 • Add 1-digit and 2-digit numbers to 20, including zero. • Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as $7 = \square + 2$

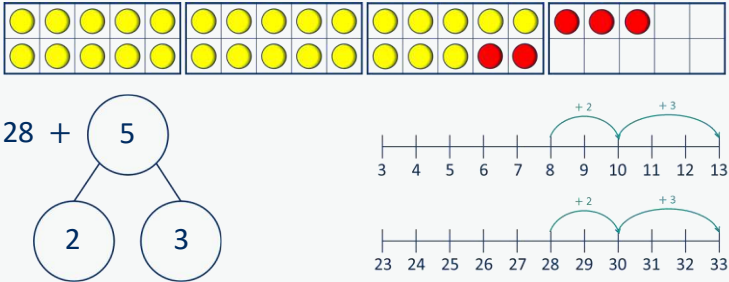| Progression of skills	Key representations		
Add together (aggregation) 2 quantities are combined to find the total.	There are … There are … There are … altogether. 	… is a part. … is a part. … is the whole. 	… plus … is equal to … … is equal to …. + … $4 + 2 = 6$ $2 + 4 = 6$ $6 = 4 + 2$ $6 = 2 + 4$
Add more (augmentation) A quantity is increased.	First… Then… Now… 	I start at … I jump on … I land on … 	… plus … is equal to … is equal to … + … $4 + 2 = 6$ $2 + 4 = 6$ $6 = 4 + 2$ $6 = 2 + 4$

Addition

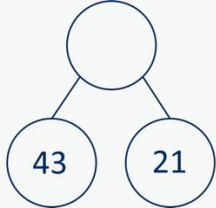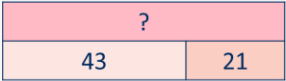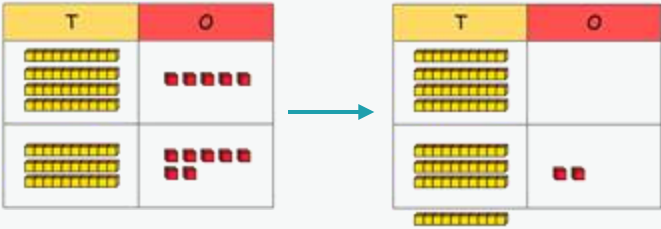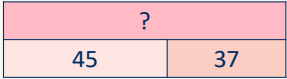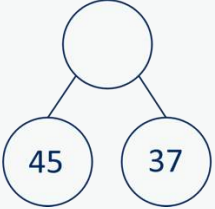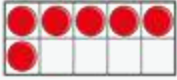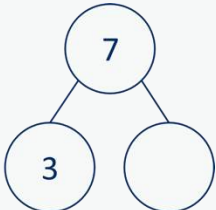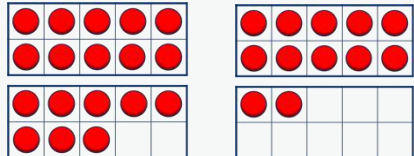| Progression of skills	Key representations		
Bonds within 10 Include bonds for each number within 10 Encourage children to notice patterns.	… is made of … and … … and … make …	… can be partitioned into … and …	… plus … is equal to … $6 + 0 = 6$ $5 + 1 = 6$ $4 + 2 = 6$ $3 + 3 = 6$ $2 + 4 = 6$ $1 + 5 = 6$ $0 + 6 = 6$
Related facts within 20 Make links to known facts.	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 Make links to known facts.	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 … $2 + \square = 6$ $6 = 2 + \square$

10

Addition

Year 2	• Recall and use addition facts to 20 fluently, and derive and use related facts up to 100
	• Add numbers using concrete objects, pictorial representations, and mentally, including:
	  • a two-digit number and 1s
	  • a two-digit number and 10s
	  • 2 two-digit numbers
	  • adding 3 one-digit numbers
	• Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Progression of skills	**Key representations**

Add ones to any number (related facts) Make links to known 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 Prompt children to understand that addition can be done in any order and to make links to known facts.	… and … are a bond to 10 $10 + … = …$ 	Double … + … = … 	What do you notice? Which addition is the easiest to calculate? $8 + 9 + 1 =$ $8 + 1 + 9 =$ $9 + 1 + 8 =$

Addition

Progression of skills	Key representations
Add across a 10 Partition the number being added to make a full ten.	... can be partitioned into ... and ... $8 +$ (5) → (2)(3) number line 3–13, $+2$, $+3$ I add ... to get to ... then I add ... $8 + 5 = 13$ $28 + 5 = 33$ $28 +$ (5) → (2)(3) number line 3–13, $+2$, $+3$ number line 23–33, $+2$, $+3$
Add multiples of 10 Make links to known facts within ten.	... ones + ... ones = ... ones so ... tens + ... tens = ... tens ■ ■ ■ + ■ ■ ||| + || $3 + 2 = 5$ $30 + 20 = 50$ What is the same? What is different? number line 0–10, $+2$ number line 0–100, $+2$ (2)(3) (20)(30) bar models: 2, 3, ? 20, 30, ?
Add 10s to any number Make links to known facts.	... tens + ... tens = ... tens ... tens and ... ones = ... ||| :. + || To add ... I need to add 10 ... times. hundred square (1–60), 34 circled I know that ... and ... = ... so ... and ... = ... $30 + 20 = 50$ $34 + 20 = 54$

Addition

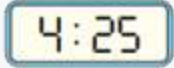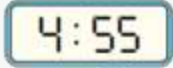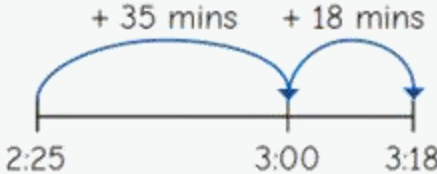| Progression of skills	Key representations
Add 2-digit numbers (not across a ten) Lining up ones and tens in columns will support with later written methods.	$\ldots$ ones $+ \ldots$ ones $= \ldots$ ones $\ldots$ tens $+ \ldots$ tens $= \ldots$ tens Tens / Ones 43 21 3 ones $+$ 1 one $=$ 4 ones 4 tens $+$ 2 tens $=$ 6 tens 6 tens $+$ 4 ones $=$ 64 ? 43 21
Add 2-digit numbers (across a ten) Begin to exchange 10 ones for 1 ten.	There are $\ldots$ ones, so I do/do not need to make an exchange. $\ldots$ ones $= \ldots$ ten and $\ldots$ ones T / O → T / O ? 45 37 45 37 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
Missing numbers Solve missing number problems and use the inverse to check.	How many more do you need to make $\ldots$? $6 + \square = 10$ $10 - \square = 6$	If $\ldots$ is a whole and $\ldots$ is a part, then $\ldots$ is the other part. $\square + 3 = 7$ $7 - 3 = \square$ 7 3	$\ldots$ can be partitioned into $\ldots$ and $\ldots$ $10 + 8 = 12 + \square$

Addition

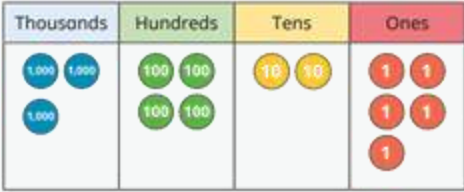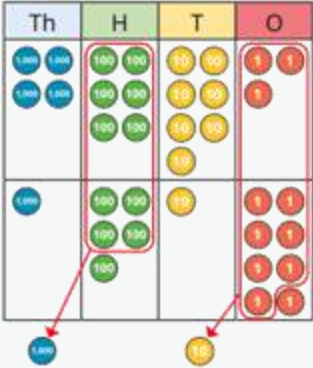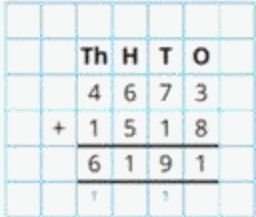| Year 3	• Add numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds. • Add numbers with up to three digits, using formal written methods of columnar addition. • Add fractions with the same denominator within 1 whole. • Calculate the time taken by particular events or tasks.
Progression of skills	**Key representations**

| **Add 1s, 10s or 100s to a 3-digit number**

 Emphasis on mental strategies including number bonds and related facts. Prompt children to notice which digit changes. | The ones/tens/hundreds column will increase by …

 $444 + 5 =$
 $444 + 50 =$
 $444 + 500 =$

 $777 + 2 =$
 $777 + 20 =$
 $777 + 200 =$ | What patterns do you notice?

 $235 + 3 =$
 $235 + 30 =$
 $235 + 300 =$

 $604 + 20 =$
 $604 + 50 =$
 $604 + 90 =$

 $111 + \boxed{} = 118$
 $111 + \boxed{} = 181$
 $111 + \boxed{} = 811$ |
| **Add two numbers (no exchange)**

 Mental strategies and introduction of formal written method. | … ones + … ones = … ones
 … tens + … tens = … tens
 … hundreds + … hundreds = … hundreds

  | |

Addition

Progression of skills	Key representations
Add two numbers across a 10 or 100 Formal written method involving up to 2 exchanges including 3-digit plus 2-digit numbers.	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 Pairs of numbers which total 100	… plus … is equal to 100

For the complements to 100 section:

I add … to get to the next 10, then … to get to 100

$$38 + 62 = 100$$
$$62 + 38 = 100$$
$$100 = 38 + 62$$
$$100 = 62 + 38$$

Addition

Progression of skills	Key representations
Add fractions with the same denominator within 1 whole Make links with known facts.	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 Find durations of time between a given start and end point. Children will need to calculate complements to 60	From ... to ... o'clock is ... minutes. From ... o'clock to ... is ... minutes. The total time taken is ... minutes. start finish 4:25 start 4:55 finish + 35 mins + 18 mins 2:25 3:00 3:18

Addition

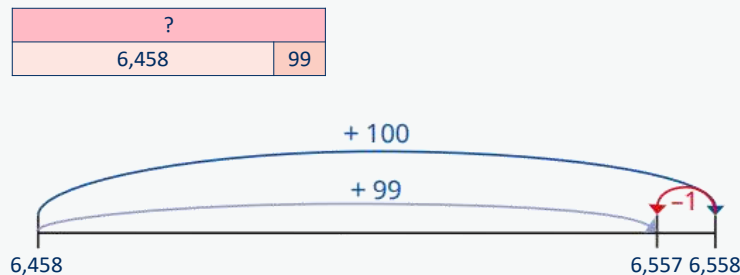| Year 4	• Add numbers with up to 4 digits using a formal written method. • Solve simple measure and money problems involving fractions and decimals to 2 decimal places. • Add fractions with the same denominator.
Progression of skills	**Key representations**

| Add 1s, 10s and 100s to a 4-digit number

Emphasis on mental strategies including number bonds and related facts. Prompt children to notice which digit changes. | The ones/tens/hundreds/thousands column will increase by …

$3,425 + 3 =$ $3,425 + 300 =$
$3,425 + 30 =$ $3,425 + 3,000 =$ | What patterns do you notice?

$2,350 + 3 =$
$2,350 + 30 =$
$2,350 + 300 =$
$2,350 + 3,000 =$

$6,040 + 200 =$
$6,040 + 500 =$
$6,040 + 900 =$

$2,211 + \boxed{} = 2,251$
$2,211 + \boxed{} = 2,215$
$2,211 + \boxed{} = 2,511$ |

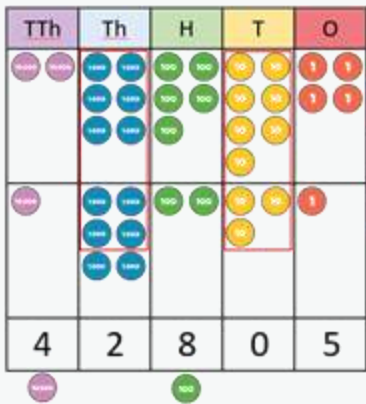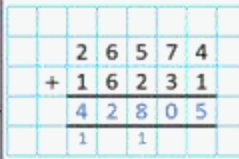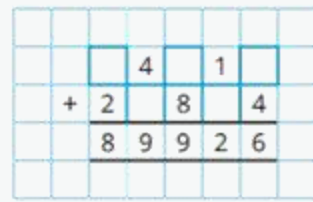| Add up to two 4-digit numbers

Formal written method with up to 3 exchanges. Encourage children to estimate and use inverse operations to check answers to calculations. | There are … ones/tens/hundreds so I do/do not need to make an exchange.

I can exchange 10 … for 1 …

 | |

Addition

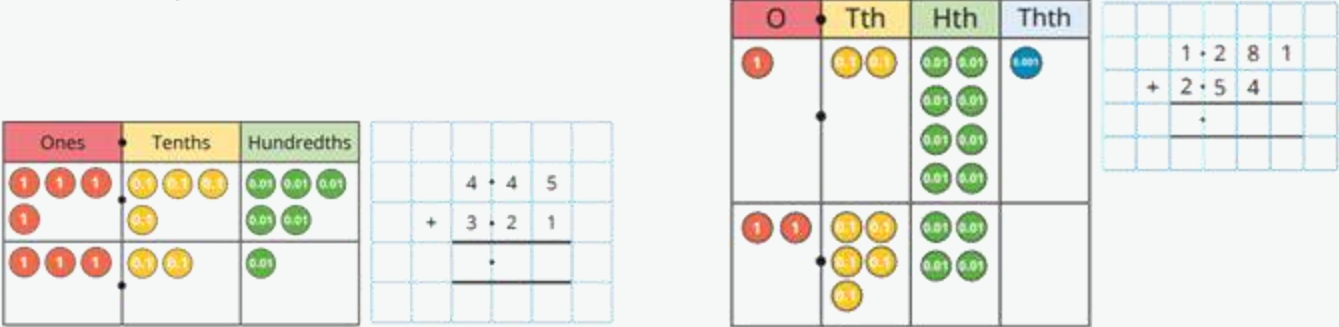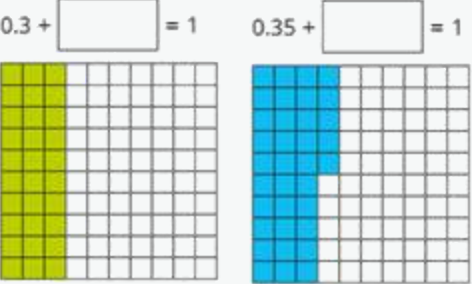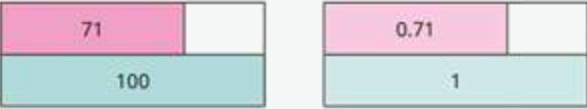| Progression of skills	Key representations
Add decimal numbers in the context of money Emphasis on partitioning and use of number lines rather than formal written calculations.	… pence + … pence = … pence … pounds + … pounds = … pounds £2.45 £3.25 $45p + 25p = 70p$ $£2 + £3 = £5$ $£5 + 70p = £5.70$ £3.25 can be partitioned into £3 + 20p + 5p $+ £3$ $+ 20p$ $+ 5p$ £2.45 £5.45 £5.65 £5.70
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 $\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $+\frac{3}{5}$ 0 1 $1\frac{1}{5}$ $1\frac{4}{5}$ 2 3

Addition

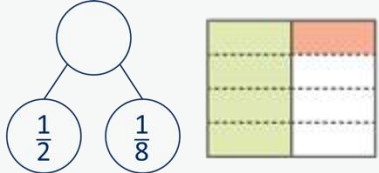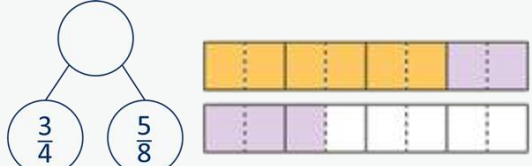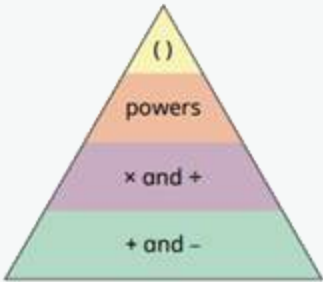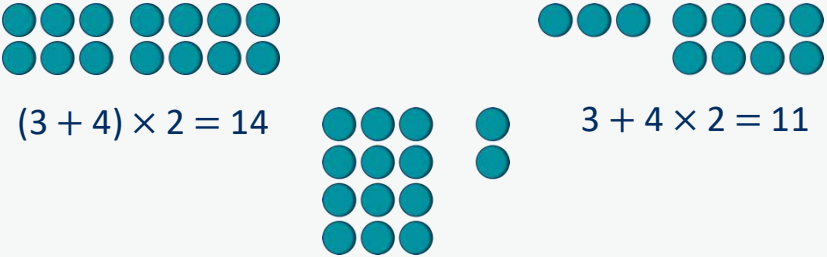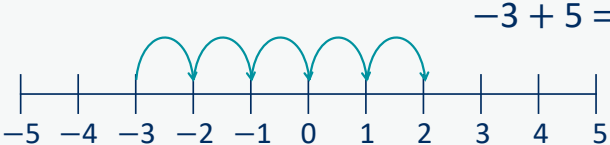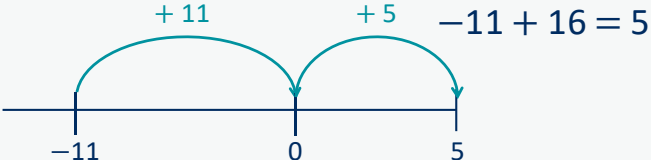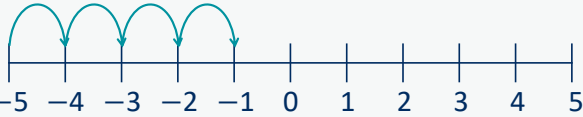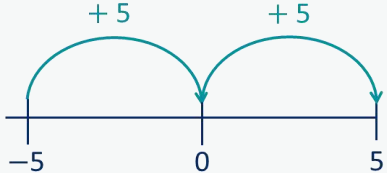| Year 5	• Add whole numbers with more than 4 digits, including using formal written methods. • Add numbers mentally with increasingly large numbers. • Add decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 • Add fractions with the same denominator, and denominators that are multiples of the same number.
Progression of skills	**Key representations**
Add using mental strategies Add 1s, 10s, 100s, etc. to any number. Use number bonds and related facts.	TTh | Th | H | T | O $48,650 + 300 =$ $48,650 + 30,000 =$ $48,650 + 30 =$ To add …, I can add … then subtract … ? 6,458 | 99 + 100 + 99 −1 6,458 6,557 6,558

Add whole numbers with more than 4 digits
 	
Encourage children to estimate and use inverse operations to check answers to calculations.
	I can exchange 10 … for 1 …
	
	TTh | Th | H | T | O
	
	4 | 2 | 8 | 0 | 5
	
	  2 6 5 7 4
	+ 1 6 2 3 1
	  4 2 8 0 5
	    1 1
	
	      4 1
	+ 2 8 4
	  8 9 9 2 6

Addition

Progression of skills	Key representations
Add decimals with up to 2 decimal places Progress from the same number of decimal places to a different number of decimal places, and from no exchange to exchange.	I do/do not need to make an exchange because … I can exchange 10 … for 1 …
Complements to 1 Pairs of numbers with up to 3 decimal places which total 1 Encourage children to make links with bonds to 10 and complements to 100 and 1,000	 $4 + 6 = 10$ $\qquad$ $0.4 + 0.6 = 1$ $44 + 56 = 100$ $\qquad$ $0.44 + 0.56 = 1$ $444 + 556 = 1{,}000$ $\qquad$ $0.444 + 0.556 = 1$

Addition

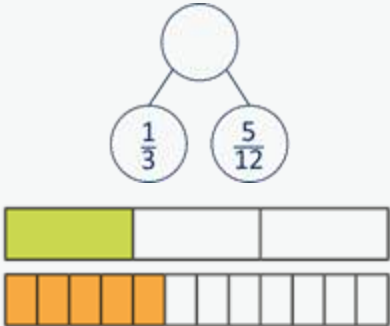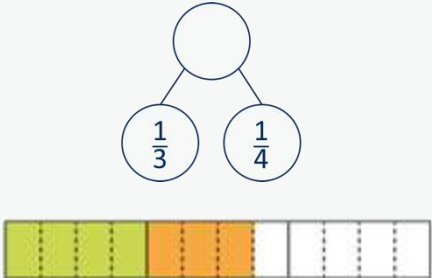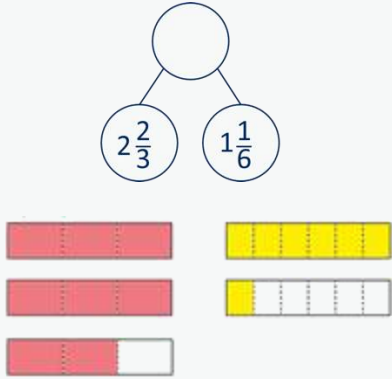| Progression of skills	Key representations
Add fractions with denominators that are a multiple of one another Encourage children to convert fractions to the same denominator before adding. Progress from adding fractions within 1 whole to adding fractions beyond 1 whole.	The denominator has been multiplied by …, so the numerator needs to be multiplied by… for the fractions to be equivalent. $\frac{1}{2} + \frac{1}{8} = \frac{4}{8} + \frac{1}{8} = \frac{5}{8}$ $\frac{1}{4} + \frac{3}{8} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}$ $\frac{3}{4} + \frac{5}{8} = \frac{6}{8} + \frac{5}{8} = \frac{11}{8} = 1\frac{3}{8}$

Addition

Year 6	• Add larger numbers, using the formal written method of columnar addition. • Use their knowledge of the order of operations to carry out calculations involving the 4 operations. • Calculate intervals across zero. • Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions.
Progression of skills	**Key representations**
Add integers up to 10 million Encourage children to estimate and use inverse operations to check answers to calculations.	
Add decimals with up to 3 decimal places Progress to numbers with digits in different place value columns. Encourage children to check that they have lined up the columns correctly.	I do/do not need to make an exchange because …

Addition

Progression of skills	Key representations
Order of operations Calculations in brackets should be done first. Multiplication and division should be performed before addition and subtraction. *When no brackets are shown and the operations have the same priority, work left to right.	... has greater priority than ..., so the first part of the calculation I need to do is ... $(3 + 4) \times 2 = 14$ $3 + 4 \times 2 = 11$ $3 \times 4 + 2 = 14$
Negative numbers Children add to negative numbers and carry out calculations which cross 0	... plus ... is equal to ... $-3 + 5 = 2$ $+11$ $+5$ $-11 + 16 = 5$ The difference between -5 and -1 is 4 $+5$ $+5$ The difference between -5 and 5 is 10

Addition

Progression of skills	Key representations		
Add fractions Convert fractions to the same denominator before adding. Progress from fractions where one denominator is a multiple of the other, to any fractions and then to mixed numbers.	The denominator has been multiplied by ..., so the numerator needs to be multiplied by ... $\frac{1}{3}$ $\frac{5}{12}$	The lowest common multiple of ... and ... is ... $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$	...is made up of ... wholes and ... $2\frac{2}{3}$ $1\frac{1}{6}$

Progression of skills - Subtraction

White Rose MATHS

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
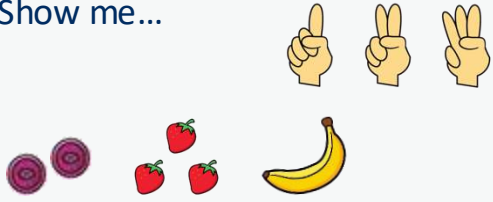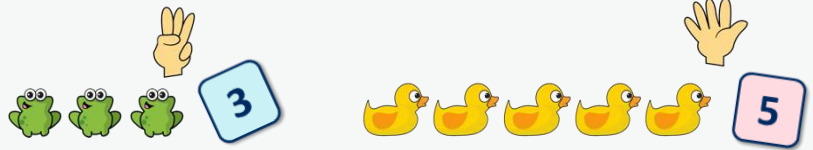
Progression of skills - Subtraction

Year group	Skill
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

Progression of skills - Subtraction

White Rose MATHS

Year group	Skill
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
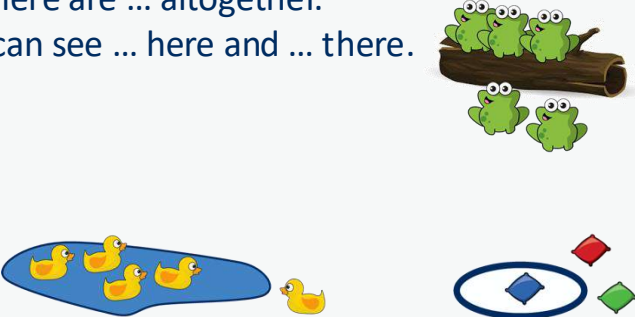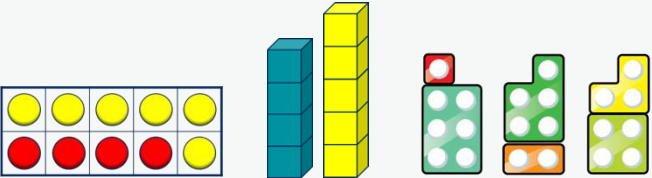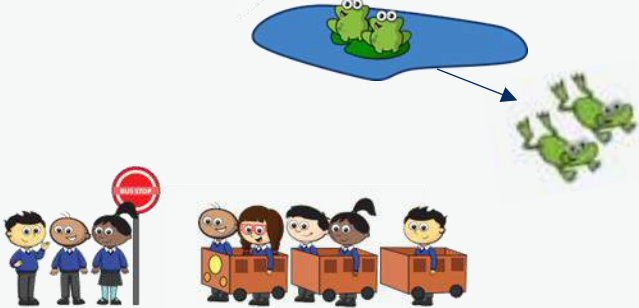
Subtraction

Nursery	• Begin to have an understanding of numbers to 5 • We recommend focusing on noticing and representing small quantities, perceptual subitising and counting.

Progression of skills	Key representations	
Subitise to 3 Instantly see how many.	How many do you see?	
Count how many Begin to count objects using 1-1 correspondence.	How many are there? 1 2 3 4 5 	Count out … from a larger group. E.g. Collect a cup for everyone at the table.
Make numbers to 5 Start by showing 1, 2 and 3 using fingers.	Show me…	Begin to link numerals to quantities.
Take 1 away Through stories, songs and rhymes.	How many do we have now?	

Subtraction

Reception	• Have a deep understanding of number to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5 • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (and some subtraction facts) and some number bonds to 10, including double facts.
Progression of skills	**Key representations**
Conceptually subitise to 5 Notice the parts that make up the whole.	What do you see? How do you see it?
1 less Continue to link to stories, songs and rhymes.	1 less than … is …
Notice the composition of numbers within 10 Link to stories, songs and rhymes.	How many...? How many...? How many altogether?
	How many ways can you make...?

Subtraction

Progression of skills	Key representations	
Partition Using objects, explore different ways to partition a number into 2 or more parts.	There are … altogether. I can see … here and … there.	… and … make …
Take away A quantity is reduced.	First… Then… Now…	I have … I take … away Now I have …