



TRJS CALCULATIONS POLICY

ADDITION: Y3 & 4

NC Year 3

Pupils should be taught to:

add and subtract numbers mentally, including:

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

Y3 FOCUS: INTRODUCE THE USE OF PARTITIONING TO CARRY OUT FORMAL COLUMN ADDITION.

Start with **expanded column addition** with 3-digit numbers to build on children's understanding of partitioning and help reinforce place value. Introduce this method using numbers that do not bridge just to build confidence (these would normally be solved mentally using place value). Emphasize correct **alignment of columns** and **always** adding the ones first.

$436 + 152$

4	0	0	3	0	6				
+	1	0	0	5	0	2			
<hr/>									
5	0	0	8	0	8	=	5	8	8

Once confident, children move on to expanded addition involving carrying.

$466 + 158$

4	0	0	6	0	6				
+	1	0	0	5	0	8			
<hr/>									
6	0	0	2	0	4	=	6	2	4
1	0	0	1	0					

Carries are placed below the equals line. You may wish to encourage children to cross them through once they have been included in the addition.

When understanding of the expanded method is secure children move on to **compact column addition**.

$466 + 158$

	4	6	6		
+	1	5	8		
<hr/>					
	6	2	4		
	+	+			

Ensure children are clear about digit value eg. 6+5 represents 6 tens + 5 tens.

NC Year 4

Pupils should be taught to:

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

Y4 FOCUS: CONSOLIDATE UNDERSTANDING OF COLUMN METHOD TO ADD NUMBERS WITH UP TO 4 DIGITS.

$6473 + 2461$

6	4	7	3		
+	2	4	6	1	
<hr/>					
8	9	3	4		
	+				

Extend to simple decimals e.g. £3.24 + £2.58

	£	3	.	2	4	
+	£	2	.	5	8	
<hr/>						
	£	5	.	8	2	
		+				



TRJS CALCULATIONS POLICY

ADDITION Y5 & 6

NC Year 5

Pupils should be taught to:

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

NC Year 6

Notes and guidance (non-statutory)

Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division.

Y5 FOCUS: COMPACT COLUMN ADDITION OF NUMBERS WITH 4 OR MORE DIGITS INCLUDING DECIMAL NUMBERS EG. IN THE CONTEXT OF MONEY OR MEASURES.

$23,481 + 1,362$

	2	3	4	8	1
+		1	3	6	2
	2	4	8	4	3
			↑		

$£64.50 + £19.63$

	£	6	4	.	5	0
+	£	1	9	.	6	3
	£	8	4	.	1	3
				+	↑	

Note: use of commas to separate thousands is not a prerequisite and may be avoided if causing confusion.

Encourage children to ensure that the decimal point is always correctly aligned.

$23.59 + 7.55$

	2	3	.	5	9
+		7	.	5	5
	3	1	.	1	4
			+	↑	↑

Y6 FOCUS: ADDING SEVERAL NUMBERS WITH INCREASING COMPLEXITY.

$81059 + 3668 + 15301 + 20551$

	8	1	0	5	9	
		3	6	6	8	
		1	5	3	0	1
+		2	0	5	5	1
	1	2	0	5	7	9
		↑	↑	↑	↑	

$23.361 + 9.08 + 59.77 + 1.3$

	2	3	.	3	6	1
		9	.	0	8	0
	5	9	.	7	7	0
+		1	.	3	0	0
	9	3	.	5	1	1
		↑	↑	↑	↑	

Where there are differing numbers of digits after the decimal point, encourage children to include zeros in order to support place value and the idea that there is no value to add.



TRJS CALCULATIONS POLICY

SUBTRACTION Y3 & 4

NC Year 3

Pupils should be taught to:

add and subtract numbers mentally, including:

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

NC Year 4

Pupils should be taught to:

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

Y3 FOCUS: ONCE CONFIDENT USING A NUMBER LINE TO SUBTRACT, CHILDREN USE PARTITIONING TO CARRY OUT FORMAL COLUMN SUBTRACTION.

Start with **expanded column subtraction** to ensure a robust understanding of place value.

$758 - 326$

7	0	0	5	0	8				
-	3	0	0	2	0	6			
<hr/>									
4	0	0	3	0	2	=	4	3	2

To begin, use examples where exchanges are not required (usually place value would be used to solve these calculations).

A solid understanding of place value and base 10 is vital. It is important children realize that the value has not changed, we have just partitioned in a different way. As you can see here for $372 - 147$, before subtracting 7 units, one ten will need to be **exchanged** for 10 ones (units).

$372 - 147$

			6	0					
3	0	0	7	0	12				
-	1	0	0	4	0	7			
<hr/>									
2	0	0	2	0	5	=	2	2	5

Children who are secure with the concept of 'exchanging' should now be able to use the partitioning column method to subtract any two numbers.

$726 - 354$

6	0	0							
7	0	0	1	2	0	6			
-	3	0	0	5	0	4			
<hr/>									
3	0	0	7	0	2	=	3	7	2

Note: vocabulary '**exchange**' not 'borrow'.

Y4 FOCUS: CONSOLIDATE UNDERSTANDING OF COLUMN SUBTRACTION OF NUMBERS WITH UP TO 4 DIGITS

Extend to **compact column subtraction** once the expanded method has been mastered.

$726 - 354$

6	7	1	2	6
-	3	5	4	
<hr/>				
3	7	2		

$4036 - 1327$

3	4	0	3	6
-	1	3	2	7
<hr/>				
2	7	0	9	

Include examples of repeated exchanges when the next digit is a zero e.g. $4079 - 2892$

3	4	0	7	9
-	2	8	9	2
<hr/>				
1	1	8	7	



NC Year 5

Pupils should be taught to:

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

NC Year 6

Notes and guidance (non-statutory)

Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division.

Y5 FOCUS: SUBTRACT USING NUMBERS BEYOND 4 DIGITS INCLUDING DECIMALS

Children come across compact column subtractions where multiple exchanges are needed to solve the problem.

$$\begin{array}{r}
 31086 \\
 - 2128 \\
 \hline
 28958
 \end{array}$$

Once confident with multiple exchanges and larger whole numbers, children are ready to move on to decimal subtractions involving money or measures. If subtracting a decimal from an integer, emphasize the need to add a zero in the decimal position.

$$7169 - 372.5$$

$$\begin{array}{r}
 7169.0 \\
 - 372.5 \\
 \hline
 6796.5
 \end{array}$$

It is important that children understand the need to always align the decimal point.

Y6 FOCUS: SUBTRACTING WITH INCREASINGLY COMPLEX NUMBERS.

In Y6, children will come across problems involving numbers with 6 or more digits, increasing decimal places and requiring multiple exchanges. An embedded understanding of place value is key to mastery.

$$180699 - 89949$$

$$\begin{array}{r}
 180699 \\
 - 89949 \\
 \hline
 90750
 \end{array}$$

$$105.08 - 36.419$$

$$\begin{array}{r}
 105.080 \\
 - 36.419 \\
 \hline
 68.661
 \end{array}$$



TRJS CALCULATIONS POLICY

MULTIPLICATION Y3 & 4

NC Year 3

Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

NC Year 4

Pupils should be taught to:

- recall multiplication and division facts for multiplication tables up to 12×12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Y3 FOCUS: GRID MULTIPLICATION FOR 2-DIGIT X 1-DIGIT CALCULATIONS.

Children move on from arrays and begin to use the **grid method** of multiplication. It is important that children should be able to:

- Partition numbers into tens and ones/hundreds, tens and ones.
- Multiply single digits by multiples of 10

Once the partitioned parts of the number have been multiplied, they must be added. When adding, column addition could be used to ensure accuracy, especially where bridging will be needed.

7×36

x		30	6
7	21	0	42

Remind children that $7 \times 30 = 7 \times 3 \times 10$

Y4 FOCUS: 3-DIGIT X 1-DIGIT MULTIPLICATION USING THE GRID METHOD THEN PROGRESS TO SHORT MULTIPLICATION.

Ensure children are clear about digit/place value eg 7×400 not 7×4 and emphasize correct alignment of columns to prevent errors when adding. The **ladder method** (expanded form) is used to link the grid method and short multiplication.

7×453

grid

x	400	50	3
7	2800	350	21



ladder

	4	5	3		
x			7		
		21		(7 x 3)	
		350		(7 x 50)	
+	2800			(7 x 400)	
	3171				
+					



short multiplication

	4	5	3
x			7
	3	1	7
	2		



TRJS CALCULATIONS POLICY

MULTIPLICATION Y5 & 6

NC Year 5

Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally, drawing upon known facts
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
- recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

NC Year 6

Pupils should be taught to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the 4 operations

Y5 FOCUS: MULTIPLYING UP TO 4 DIGITS BY 1 OR 2 DIGITS INCLUDING LONG MULTIPLICATION

Multiplying a 2-digit number by a 3-digit number should be introduced through the grid method before moving to long multiplication.

$$234 \times 16$$

The ladder method is used to transition from the grid method to long multiplication.

grid

	X	200	30	4				
10	2000	300	40					
6	1200	180	24					
3200 + 480 + 64 = 3744								

ladder

	234							
X	16							
	24	(6 x 4)						
	180	(6 x 30)						
	1200	(6 x 200)						
	40	(10 x 4)						
	300	(10 x 30)						
+	2000	(10 x 200)						
	3744							

long multiplication

		234						
X		16						
		1404						
+		2340						
		3744						

Remind children to use a placeholding zero when multiplying by tens.

Y6 FOCUS: CONSOLIDATING SHORT AND LONG MULTIPLICATION, MULTIPLYING DECIMALS BY 1 DIGIT

$$8 \times 3.19$$

	3.19			
X		8		
	25.52			



NC Year 3

Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

NC Year 4

Pupils should be taught to:

- recall multiplication and division facts for multiplication tables up to 12×12
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

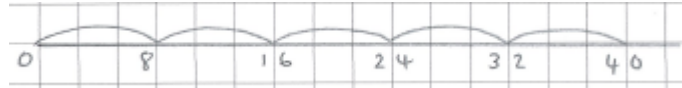
Notes and guidance (non-statutory)

Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers.

Y3 FOCUS: DIVIDE 2-DIGIT NUMBERS BY 1-DIGIT NUMBERS MOVING FROM NUMBER LINE TO SHORT DIVISION

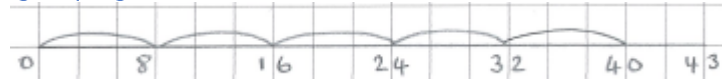
Grouping using a number line helps to cement children's understanding of division as grouping. With zero at the beginning of the number line and the dividend at the end of the line, jump in steps of the divisor.

$40 \div 8 = 5$



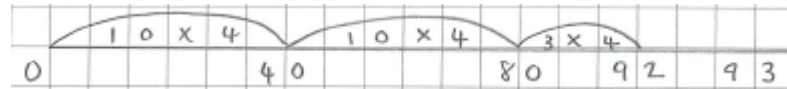
Children progress to grouping with remainders.

E.g. $43 \div 8 = 5 \text{ r } 3$



Once confident, children will begin to solve problems involving bigger numbers. To solve this efficiently they subtract multiples of the divisor.

$93 \div 4 = 23 \text{ r } 1$



Once confident with division using a number line, children move on to short division (bus stop method), Initially dividing 3-digit numbers by 1-digit numbers where each digit is a multiple of the divisor. E.g. $96 \div 3$

$$\begin{array}{r} 32 \\ 3 \overline{)96} \end{array}$$

Y4 FOCUS: CONSOLIDATING AND EXTENDING USE OF SHORT DIVISION

As children progress, they will move on to problems where the first digit of the dividend is not a multiple of the divisor and therefore a remainder will need to be carried.

$$96 \div 8 \begin{array}{r} 12 \\ 8 \overline{)96} \end{array}$$

Move on to 3-digit divisions. $872 \div 4$

$$872 \div 4 \begin{array}{r} 218 \\ 4 \overline{)872} \end{array}$$

Include examples where the answer in one column is zero and reinforce the need for place holding zero.

$742 \div 7$

$$\begin{array}{r} 106 \\ 7 \overline{)742} \end{array}$$

Where the first column (hundreds column) is a zero. Encourage children to record the hundred initially as this will help them remember its place and the numbers value. $162 \div 6$

$$\begin{array}{r} 027 \\ 6 \overline{)162} \end{array}$$



TRJS CALCULATIONS POLICY

DIVISION Y5 & 6

NC Year 5

Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

NC Year 6

Pupils should be taught to:

- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- identify common factors, common multiples and prime numbers
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Y5 FOCUS: EXTENDING USE OF SHORT MULTIPLICATION TO 4 DIGITS AND REMAINDERS

Children begin to solve **short division** problems where a number up to 4 digits is divided by a single digit number including answers **with remainders**.

$$3763 \div 3$$

	1	2	5	4	r	1
3	3	7	6	3		

Start to introduce problems in context with the remainder appropriately expressed e.g. as an integer, a fraction, a decimal, rounded up or rounded down. $4505 \div 4$

Integer

	1	1	2	6	r	1
4	4	5	0	5		

Fraction

	1	1	2	6	$\frac{1}{4}$
4	4	5	0	5	

Decimal

	1	1	2	6	.	2	5
4	4	5	0	5	.	0	0

Y6 FOCUS: USING SHORT DIVISION TO DIVIDE 4 DIGIT NUMBERS WITH REMAINDERS AS DECIMALS, FRACTIONS OR NUMBER

The focus in year 6 is not so much the method of short division but on understanding the context of the questions to make decisions about how the remainders are expressed.

When using formal methods to divide by a 2-digit number, encourage children to make notes of known multiples to support their calculations.

$$13095 \div 45$$

				2	9	1											
45)	1	3	0	9	5											

$1 \times 45 = 45$
$2 \times 45 = 90$
$4 \times 45 = 180$
$10 \times 45 = 450$

