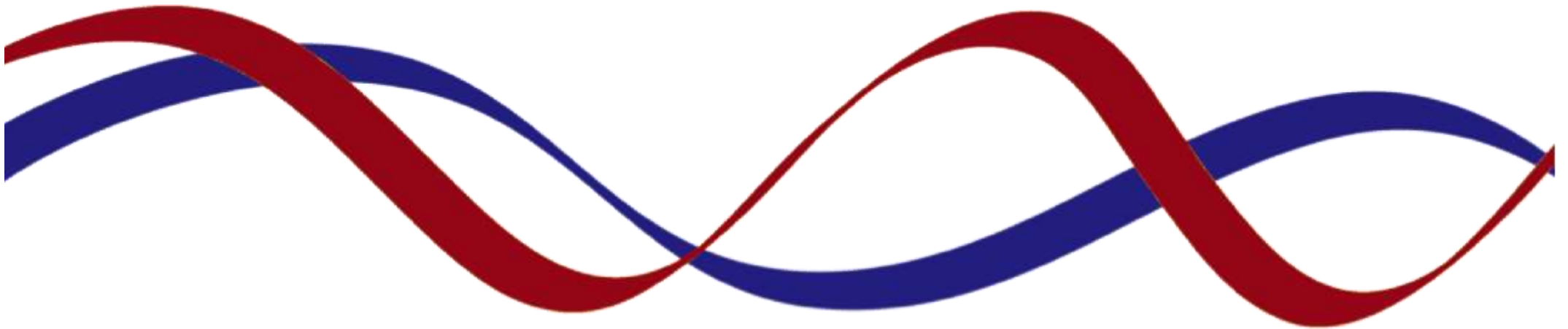# Brynnau Primary School
Ysgol Gynradd Brynnau

**Calculation Policy
2023-2025**

'Helping each other to succeed'
'Helpu'n gilydd i lwyddo'

This policy contains the key pencil and paper procedures that will be taught within Brynnau Primary School. It has been written to ensure consistency and progression throughout the school and reflects a whole school agreement.

Although the focus of the policy is on pencil and paper procedures, it is important to recognise that the ability to calculate mentally and reason about mathematics lies at the heart of the New Curriculum for Mathematics. The mental methods will be taught systematically through Big Maths daily CLIC sessions and pupils will be given regular opportunities to develop the necessary skills. However, mental calculation is not at the exclusion of written recording and should be seen as complementary to and not as separate from it. In every written method there is an element of mental processing. Sharing written methods with the teacher encourages children to think about the mental strategies that underpin them and to develop new ideas. Therefore, written recording both helps children to clarify their thinking and extends the development of more fluent and sophisticated strategies.

During their time at Brynnau Primary school, children will be encouraged to see mathematics as both a written and spoken language.
Teachers will support and guide children through the following important stages:

- developing the use of manipulatives, pictures, and symbols to represent activities;
- using standard symbols and methods;
- use of jottings to aid a mental strategy;
- use of pencil and paper procedures;

Vocabulary:
The correct terminology should be used to support the children's understanding of place value:
- When partitioning or using the formal addition method, 68 + 47 should be read *'sixty add forty'* not *'six add four'*
- The number 345 consists of *'3 hundreds'*, *'4 tens'* and *'5 ones/units'*
- The term *'calculations'* should be used rather than *'sums.'*

Aims:
Children should be able to choose an efficient method, mental or written, appropriate to the given task. By the end of year 6, children working at age-appropriate level and above will have been taught, and be secure with, a compact standard method for each operation.

General Progression:
- Establish mental methods, based on a good understanding of place value

- Use of informal jottings to aid mental calculations
- Develop use of an empty number line to help mental imagery and aid recording
- Use partitioning and recombining, with the use of manipulatives, to aid informal methods
- Introduce expanded written methods with the aid of manipulatives where necessary
- Develop expanded methods into compact standard written form.

Before carrying out a calculation, children will be encouraged to consider:
- Can I do it in my head? (Using rounding, adjustment, partitioning and recombining)
- The size of an approximate answer (estimation)
- Could I use jottings to keep track of the calculation?
- Do I need to use an expanded or compact written method?

Consider the following questions to develop children's understanding of the formal procedures:

Addition and subtraction:
- Do they know addition and subtraction facts to 20?
- Do they understand place value, and can they partition numbers?
- Can they add three single digit numbers mentally?
- Can they add and subtract any pair of two-digit numbers mentally?
- Can they explain their mental strategies orally and record them using informal jottings?
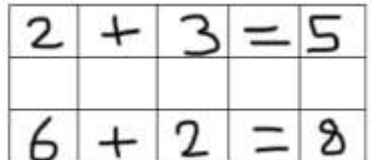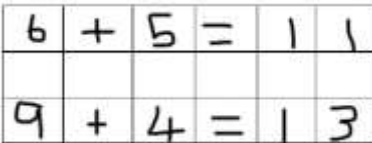
Multiplication and Division:
- Do they know their times tables confidently?
- Do they know the result of multiplying by 1 and 0?
- Do they understand 0 as a place holder?
- Can they multiply two- and three-digit numbers by 10, 100 and 1000?
- Can they double and halve two-digit numbers mentally?
- Can they use multiplication facts they know to derive mentally other multiplication facts that they do not know?

Addition Year 1

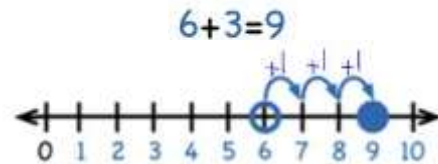**Focus: Adding with 1-digit and 2-digit numbers to 20, including 0.**

In year 1 the children will build on their knowledge of numbers to 20 from the Foundation Stage. They will begin by using simple strategies to add two group of objects together and move onto recording their number sentences orally and written.

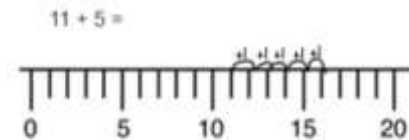| Prior Learning (EYFS Skills)	Before moving onto addition children need to be able to:	
• Count reliably to 20.	Form numbers 0 – 10 (then to 20)	
• Order numbers 1 – 20.	Say numbers in order (at least to 10)	
• Say 1 more/1 less to 20. • Add & subtract two single digit numbers.		Children begin to add units together using physical objects e.g., 2 cubes add 1 cube equals 3 cubes. They count each object to find how many altogether. Teacher models the language e.g., '3 cups add 6 cups equals 9 cups altogether'. They begin to record by drawing pictures/marks.
Next steps (Yr2 skills) • Compare & order numbers up to 100. • Read & write all numbers to 100 in digits & words.		The teacher models what the adding of two groups looks like in a number sentence. The children begin to copy these number sentences onto whiteboards whilst still using objects to add.
• Say 10 more/less than any number to 100. • Recall & use +/- facts to 20. • Derive & use related facts to 100. • Recognise PV (Place Value) of any 2-digit number.		The children become more independent and start to write number sentences into their maths books (squared maths paper) ensuring one digit in each box.
• Recognise & use		Children begin to add numbers that bridge 10 using the same strategies. Introduce language of tens and units. Continue to use objects e.g., cubes or counters.

$10 + 6 = 16$ $12 + 3 = 15$	Children start to add a 1-digit number to a 2-digit number within 20. Objects are still used to help the addition process. Begin to bridge 20.
$6+3=9$ Number line from 0 to 10 with three jumps of +1 from 6 to 9.	Children are shown how to add using a number line. They record their findings orally to begin with before moving on to drawing the jumps themselves. Note: Each jump is one unit.
$11 + 5 =$ Number line from 0 to 20 with jumps from 11.	Partial number lines are then used as a transition to open number lines.

Key Vocabulary

Add, more, plus, make, altogether, equals, most, count on, number line, tens, units, addition, number sentence

Addition Year 2

Focus: Adding two 2-digit numbers

In year 2 children will move onto using an open number line to add 1- and 2-digit numbers. They will learn how to partition 2-digit numbers.

Prior Learning (Y1 Skills)		
Prior Learning (Y1 Skills) • Count to & across 100, forwards & backwards from any number. • Read & write numbers to 20 in digits & words. • Read & write numbers to 100 in digits. • Say 1 more/1 less to 100 Mental Methods Written Methods Introduce concept of numbers – recognising number object Number Tracks: 4 + 2 = 6 correspondence. Resources Practical objects, Number Lines, Hundred Squares, Dienes Blocks, Cuisenaire rods • Add & subtract: • 1 digit & 2-digit numbers to 20, including zero.	10 + 3 = (open number line with +1, +1, +1 jumps: 10 21 22 23)	The children will move onto adding using an open number line to add a 1-digit number to a rounded 2-digit number e.g. 20 + 7 =.
	27 + 5 = 32 (open number line with +1, +1, +1, +1, +1 jumps: 27 ... 32)	When using this method securely, children move on to bridge 10 whilst still adding units e.g., 27 + 5 =
	21 + 10 = 31 (open number line with +10 jump: 21 to 31)	Once the children can confidently add a 1-digit number to a 2-digit number they can move on to adding two 2-digit numbers. To make it simpler for them they should start by adding rounded tens e.g., 21 + 10

Extend by adding multiple tens e.g., 21 + 20 |
| | 23 / \ 20 + 3 | Children will build on their number knowledge by partitioning 2-digit numbers into tens and units, so they are ready for the next step. The children **must** be confident in their understanding of place value before moving on. |

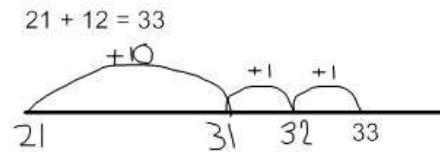|		
• Add any three 1-digit numbers with a total up to 20.	**Hundred Square:** 34 + 13 = 34 + 10 + 3 = 47 	1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100		Adding two 2-digit numbers using a 100 square grid. Count on in 10s and count on in units/ones to find the total.
Next steps (Yr3 skills) • Compare & order numbers up to 100. • Read & write all numbers to 100 in digits & words. • Say 10 more/less than any number to 100. • Count in multiples of 2, 3 & 5 & 10 from any number up to 100. • Recall & use +/- facts to 20. • Derive & use related facts to 100. T U 14 Unnumbered Number Line: 23 + 13 = 36 • Recognise PV of any 2- digit number. • Recognise & use inverse (+/-).	21 + 12 = 33	Adding two 2-digit numbers using an open number line using their prior knowledge of adding tens and units. The children only need to partition the smaller number to add. Adding two 2-digit numbers using a 100 square grid. Count on in 10s and count on in units/ones.
	43 + 24 = **40 + 20 = 6 0** **3 + 4 = 0 7**	Children partition 2-digit numbers to add 2 digits add 2 digits. They add the tens and units separately (aligning the **tens** and units/ones in the correct columns. The children add the tens total and the units total for answer the calculation.
	Key Vocabulary Add, more, plus, and, make, altogether, total, equal to, equals, the same as, most, count on, number line, number sentence, tens, units/ones, partition, addition, *hundreds*	

Addition Year 3

Focus: Adding with numbers up to 3 digits

In year 3 we will move to the traditional column method and to support this, children will first apply their partitioning skills to the partitioning column method.

Prior Learning (Y2 Skills)		
Prior Learning (Y2 Skills) • Compare & order numbers up to 100. • Read & write all numbers to 100 in digits & words. • Say 10 more/less than any number to 100. • Recall & use +/- facts to 20. • Derive & use related facts to 100. • Recognise PV of any 2-digit number. • Recognise & use inverse (+/-). **Next steps (Yr4 Skills)** • Count backwards through zero to include negative numbers. • Compare and order numbers beyond 1000. • Compare and order numbers with 2 decimal places.	246 + 132 = 378 200+100=300 040+030=070 006+002=008	Introduce the partitioning column method with numbers that do not bridge so children become confident with the method itself.
	337 + 188 = 525 300+100=400 030+080=110 007+008=015	Once confident, children can start using the partitioning column method to solve problems that bridge the tens and hundreds boundaries.

	116 + 343= 459
	  343
	+ 116
	  459
		Now children are ready to move on to the traditional column methods. Introduce this initially with numbers that do not bridge any boundaries. It is important children remember that it is three hundred add one hundred, NOT 3 + 1!

	245 + 84 = 329 245 + 84 329 1	Once the method is secure children are now ready to be introduced to 'carrying' which happens when bridging in the column method. Make sure children add the units first and 'carry' numbers under the bottom line.

- Find 1000 more/less than a given number.
- Recognise Place Value of any 4-digit number.

Key Vocabulary

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, *hundreds boundary, increase, vertical, carry, expanded, compact*

Addition Year 4

Focus: Adding with numbers up to 4 digits

In year 4 children will consolidate their use of the traditional column method and will be able to use it confidently to add numbers up to 4 digits. This could include carrying units, tens and hundreds.

Prior Learning (Yr3 Skills)

Compare & order numbers up to 100.
• Read & write all numbers to 100 in digits & words.
• Say 10 more/less than any number to 100.
• Count in multiples of 2, 3 & 5 & 10 from any number up to 100.
• Recall & use +/- facts to 20.
• Derive & use related facts to 100. T U 14
Unnumbered Number Line: 23 + 13 = 36
• Recognise PV of any 2- digit number.
• Recognise & use inverse (+/-).

Next Steps (Yr5 skills)

• Count forwards & backward with positive & negative numbers through zero.
• Count forwards/backwards in steps of powers of 10 for any given number up to 1000000.
• Compare & order numbers with 3 decimal places.
• Recognise PV of any number

256+167=423
  256
+167
  423
 1 1

4267 + 1584 = 5851
  4267
+ 1584
  5851
  1 1

Key Vocabulary

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, *thousands, hundreds, digits, inverse.*

Children should already be familiar with the column method from year 3 but it is particularly important to go over the method again ensuring children understand why they start with the units, have to carry a number etc.

Please Note:
1)   The units must be added first.
2)   'Carry' numbers underneath the bottom line
3)   Reinforce the place value! It is not 6 add 8, it is 6 tens add 8 tens

Focus: Adding with more than 4 digits

In year 5 children will now use the column method to add decimal numbers in the context of money and measures. It is important that children have place value skills beyond 4 digits here and fully understand what a decimal number represents.

Prior Learning (Yr4 Skills) • Count backwards through zero to include negative numbers. • Compare and order numbers beyond 1000. • Compare and order numbers with 2 decimal places. • Find 1000 more/less than a given number. • Recognise Place Value of any 4-digit number. **Next Steps (Yr6 Skills)** Understand and use place value for decimals, measures and integers of any size. • Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions and mixed numbers, all both positive and negative.	$$\begin{array}{r} £23.59 \\ + £7.55 \\ \hline £31.14 \end{array}$$	The decimal point needs to be lined up just like all the other place value columns and must be remembered in the answer column. It is important children understand why this is and get into this habit very quickly.
	$$\begin{array}{r} 23{,}481 \\ + 1{,}362 \\ \hline 24843 \end{array}$$	Children should be working with numbers greater than 4 digits including numbers in the ten thousands and hundred thousands.
	$$\begin{array}{r} 19.01 \\ 3.65 \\ + 0.70 \\ \hline 23.36 \end{array}$$	Children need to start using the column method to add more than two values, still considering place value very carefully. Please Note: 1) It is important that children say 6 tenths add 7 tenths so they understand that they are adding part of a number not a whole number.

• Recognise and use relationships between operations including inverse operations

2)   Empty places should be filled with a zero to show the value of that place.

Key Vocabulary
Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, *decimal place, decimal point, tenths, hundredths, thousandths.*

Addition Year 6

Focus: Adding several numbers with an increasing level of complexity

In year 6 children need to use all the previous adding skills developed to add several numbers with a variety of different decimal places. Many of these problems will be in the context of money or measures.

Prior Learning (Yr5 skills)		
• Count forwards & backward with positive & negative numbers through zero. • Count forwards/backwards in steps of powers of 10 for any given number up to 1000000. • Compare & order numbers with 3 decimal places. • Recognise PV of any number	$$\begin{array}{r} 2\,3 \,.\, 3\;6\;1 \\ 9 \,.\, 0\;8\;0 \\ 5\,9 \,.\, 7\;7\;0 \\ +\quad 1 \,.\, 3\;0\;0 \\ \hline 9\,3 \,.\, 5\;1\;1 \\ {\scriptstyle 2\;1\quad\;2} \end{array}$$	Children need to use their knowledge of the decimal point to line up their amounts correctly in the column. Zeroes should be added to support place value, showing that there is no value to add. Note- children are asked to put the decimal points in first and then place the digits around the decimal points.

$$\begin{array}{r} 81{,}059 \\ 3{,}668 \\ 15{,}301 \\ +\ 20{,}551 \\ \hline 120{,}579 \\ \tiny 1\ \ 1\ \ 1\ \ 1 \end{array}$$	Children should also continue to add multiple integers with 4 digits or more.

Key Vocabulary
Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal place, decimal point, tenths, hundredths, thousandths, *integer*

Subtraction Year 1

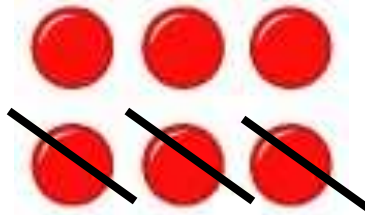**Focus: Subtracting with 1 digit and 2 digit numbers to 20, including 0.**

In year 1 the children will build on their knowledge of numbers to 20 from the Foundation Stage. They will begin by using simple strategies to subtract from a group of objects and move onto recording their number sentences orally and written.

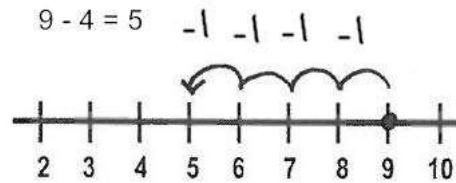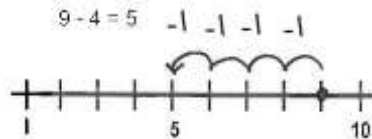|		
Prior Learning (EYFS Skills) • Say some number names in sequence • Uses words like 'more' and 'less' • Knows that a group of things changes when an object is added or taken away. • Sings songs using numbers **Next Steps (Y2 Skills)** • Compare & order numbers up to 100. • Read & write all numbers to 100 in digits & words. • Say 10 more/less than any number to 100. • Recall & use +/- facts to 20. • Derive & use related facts to 100. • Recognise PV of any 2-digit number. • Recognise & use inverse (+/-).		Children begin to subtract units from a large group using physical objects e.g. teddy bears or counters. They count each object to find how many left. Teacher models the language e.g. '6 cups take away 3 cups equals 3 cups'. They begin to record by drawing pictures/marks.
		The teacher models what the subtraction looks like in a number sentence. The children begin to copy these number sentences onto whiteboards whilst still using objects to help them subtract.
		The children become more independent and start to write number sentences into their maths books (squared maths paper) ensuring one digit in each box.

1 0 − 3 = 7 1 2 − 5 = 7	Children begin to subtract numbers that bridge 10 using the same strategies. A 1digit number is subtracted from a 2 digit number. Introduce language of tens and units. Continue to use objects e.g. blocks.
9 - 4 = 5 −1 −1 −1 −1 2 3 4 5 6 7 8 9 10	Children are now shown how to subtract using a number line. They record their findings orally to begin with before moving on to drawing the jumps themselves. *Note: Biggest number is circled and children jump back along the number line to find the answer. Jumps are one unit each.*
9 - 4 = 5 −1 −1 −1 −1 5 10	Partial number lines are then used as a transition to open number lines.
Key Vocabulary Take away, less, minus, subtract, how many more, how many fewer/less than, most, least, how many left, partition, tens, units, *digit*	

Subtraction Year 2

Focus: Subtracting with two 2 digit numbers

Children will begin to count back using a blank number line to subtract. They will use these methods both written and mentally.
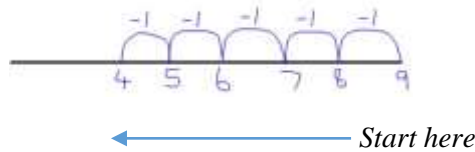
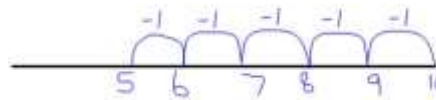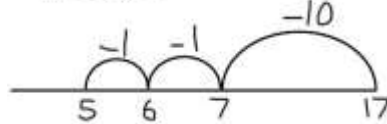| Prior Learning (Y1 Skills)		
Prior Learning (Y1 Skills) • Count to & across 100, forwards & backwards from any number. • Read & write numbers to 20 in digits & words. • Read & write numbers to 100 in digits. • Say 1 more/1 less to 100 • Add & subtract: • 1 digit & 2 digit numbers to 20, including zero. • Add any three 1- digit numbers with a total up to 20. **Next Steps (Y3 Skills)** • Compare & order numbers up to 100. • Read & write all numbers to 100 in digits & words. • Say 10 more/less than any number to 100. • Count in multiples of 2, 3 & 5 & 10 from any number up to 100. • Recall & use +/- facts to 20. • Derive & use related facts to 100. • Recognise PV of any 2-digit number. • Recognise & use inverse (+/-).	9 - 5 = 4 *Start here*	Once the children are confident using a tracked number line, they will be shown how to use a blank number line. They will start by subtracting units in (backward) jumps of one.
	10 - 5 = 5	Children now bridge 10 when subtracting units from a two digit number under 20.
	12 ⟋ ⟍ 10 2	Partitioning is taught (or recapped) so that children can start to subtract two 2 digit numbers.
	17 - 12 = −1 −1 −10 5 6 7 17	Children are now ready to subtract tens and units on an open number line. *Note: Jump large tens and small units. Biggest number goes at the end of the number line.* *Only the smaller number needs to be partitioned.*
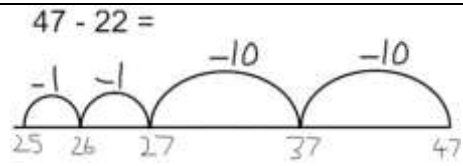
	47 - 22 = -10 -10 -1 -1 25 26 27 37 47	Continue to increase difficulty by subtracting larger numbers with multiple tens. Note: Work with numbers up to 100.
	Key Vocabulary Equal to, take away, less, minus, subtract, difference between, how many more, how many fewer/less than, most, least, count back, how many left, count on, partition, tens, units, *digit*	

Subtraction Year 3
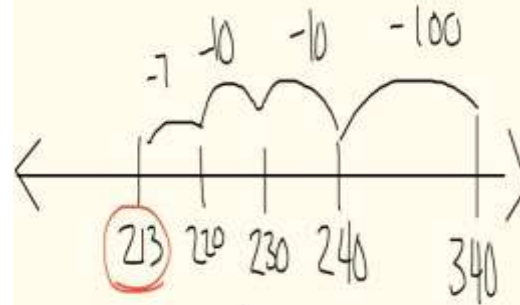
Focus: Subtracting with 2 and 3 digit numbers

Children will consolidate their knowledge of counting back and counting on using a blank number line to subtract. They will use these methods both written and mentally. Once children become fully confident they will be ready to move on to the partitioning column method of subtraction.

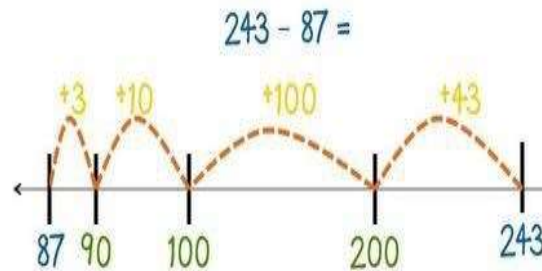| **Prior Learning (Y2 Skills)**		Children will continue to subtract on a number line
• Compare & order numbers up to 100. • Read & write all numbers to 100 in digits & words. • Say 10 more/less than any number to 100. • Recall & use +/- facts to 20. • Derive & use related facts to 100. • Recognise PV of any 2-digit number. • Recognise & use inverse (+/-). **Next Steps (Y4 Skills)** • Count backwards through zero to include negative numbers. • Compare and order numbers beyond 1000. • Compare and order numbers with 2 decimal places. • Find 1000 more/less than a given number. • Recognise Place Value of any 4-digit number.		using efficient jumps and now apply these to 3 digit number problems. Here is an efficient example of 340 – 127=
		Counting on will also be used for problems greater than 100 using efficient jumps, the use of 100 square can support children's understanding of this method.
		Once confident children are ready to move on to the column subtraction up to 3 digits. It is important that you understand place value and put each number in the correct column. First you need to put the smaller number underneath the larger number so that the hundreds are above the hundreds, tens above the tens and units above the units. Begin subtracting the bottom number from the top number from the units column. If the

| | | number on the bottom is bigger then you exchange from the place value digit to the left column. |
| | **Key Vocabulary** Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is_?, count on, strategy, partition, tens, units, *exchange, decrease, hundreds, value, digit* | |

Subtraction Year 4

Focus: Subtracting with numbers up to 4 digits

Children will consolidate their knowledge of the partitioning column method for subtraction with 4 digit numbers including those where exchanging is required. Once they are secure with this they will move on to the compact (traditional) method of column subtraction.

Prior Learning (Y3 Skills)		Once confident children are ready to move on to

Prior Learning (Y3 Skills)
- Compare & order numbers up to 100.
- Read & write all numbers to 100 in digits & words.
- Say 10 more/less than any number to 100.
- Count in multiples of 2, 3 & 5 & 10 from any number up to 100.
- Recall & use +/- facts to 20.
- Derive & use related facts to 100.
- Recognise PV of any 2-digit number.
- Recognise & use inverse (+/-).

Next Steps (Y5 Skills)
- Count forwards & backward with positive & negative numbers through zero.
- Count forwards/backwards in steps of powers of 10 for any given number up to 1000000.
- Compare & order numbers with 3 decimal places.
- Recognise PV of any number up to 1000000.

$$\begin{array}{r} 2\,\overset{6}{\cancel{7}}{}^{1}5\,4 \\ -\ 1\,5\,6\,2 \\ \hline 1\,1\,9\,2 \end{array}$$

Once confident children are ready to move on to the column subtraction up to 4 digits. It is important that you understand place value and put each number in the correct column. First you need to put the smaller number underneath the larger number so that the thousands are above the thousands, hundreds above the hundreds, tens above the tens and units above the units. Begin subtracting the bottom number from the top number from the units column. If the number on the bottom is bigger then you exchange from the place value digit to the left column.

	Key Vocabulary
	Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is_?, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, *inverse.*

Subtraction Year 5

Focus: Subtracting with numbers beyond 4 digits including decimals

Children in year 5 will continue to use the compact column method of subtraction to solve problems including those where exchanging is required. They will subtract larger integers and begin to subtract decimal amounts.

Prior Learning (Y4 Skills)		
Prior Learning (Y4 Skills) • Count backwards through zero to include negative numbers. • Compare and order numbers beyond 1000. • Compare and order numbers with 2 decimal places. • Find 1000 more/less than a given number. • Recognise Place Value of any 4-digit number.	$\begin{array}{r} {}^{2}\cancel{3}\,{}^{1}\cancel{1}\,0\,{}^{4}\cancel{5}\,{}^{1}6 \\ -\quad 2\,1\,2\,8 \\ \hline 2\,8{,}9\,2\,8 \end{array}$	Children will come across problems where exchanging will need to take place several times to complete the problem.
Next Steps (Y6 Skills) Understand and use place value for decimals, measures and integers of any size. • Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions and mixed numbers, all both positive and negative. • Recognise and use relationships between operations including	$\begin{array}{r} {}^{6}\cancel{7}\,{}^{1}\cancel{1}\,{}^{1}6\,{}^{8}\cancel{9}\,.\,{}^{1}0 \\ -\quad 3\,7\,2\,.\,5 \\ \hline 6\,7\,9\,6\,.\,5 \end{array}$	Once confident with large integers, children will now be ready to move onto decimal numbers including lots in the context of measures and money. Just like addition, it is important that the children line up the decimal point and understand why they are doing this. Please Note: Where there is a space in a column it is important that children add a zero so they understand the value and know what to subtract in that column.

	Key Vocabulary
	Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is_?, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse, *tenths, hundredths, decimal place, decimal*

Subtraction Year 6

Focus: Subtracting with increasingly complex numbers including decimals In year 6, children need to use mental methods and the compact column method of subtraction to solve an increasingly complex range of calculation including those with integers, those with decimals and those with mixed numbers.

Prior Learning (Y5 Skills)		
Prior Learning (Y5 Skills) • Count forwards & backward with positive & negative numbers through zero. • Count forwards/backwards in steps of powers of 10 for any given number up to 1000000. • Compare & order numbers with 3 decimal places. • Recognise PV of any number up to 1000000.		Children will use the compact method to solve problems involving integers up to 6 digits and beyond and solve problems where they will need to use 'exchanging' several times.
		They will also solve problems in context involving increasingly large decimals. They will need to continue using their knowledge of decimal points to line up their numbers and place zeroes in any empty places so they fully understand the value of that column.
	Key Vocabulary Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is_?, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal place, decimal	

Multiplication Year 1

Focus: Solving one step multiplication problems.

In year 1 children will begin to learn how to multiply. They will work on simple multiplication problems using tangible objects and pictorial recording.

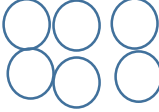| Prior Learning (EYFS SKILLS)	Before moving on to multiplication, children need to be able to …	
• Separate a group of objects in different ways recognising that the total stays the same.	• Have a secure understanding of addition and subtraction • Begin to count in multiples of 2, 5, 10	
		The teacher gives verbal instructions showing children how to 'multiply' the same amount of objects e.g. I give out 3 sweets and I do the same thing 4 times'. The children record pictorially.
Next Steps (Y2 Skills) • Count in multiples of 2, 3 & 5 & 10 from any number up to 100.		The written multiplication sentence will be modelled by the teacher and the children will start to copy onto whiteboards/into their books.
• Recall & use multiplication & division facts for 2, 5 & 10 tables. • Calculate & write multiplication & division calculations using multiplication tables. • Recognise & use inverse.	3 x 2 = *Group size x number of groups = product.*	Children record each number sentence by drawing the array e.g. put '3 cups on the maths table, do it two different ways.'
	3 x 2 = 6	Once children have shown a basic understanding of multiplication they will start to record in numbers, not pictorially anymore. They write each number sentence onto squared paper (maths books). *Note: Objects to aid working out are available at all times until children begin to use mental recall strategies.*
	Key Vocabulary	

| | Times, lots of times, array, altogether, multiply, count, *tens, units,* |

Multiplication Year 2

Focus: Solve problems involving multiplication

In year 2 children will move on from basic multiplication arrays and will be taught different strategies including repeated addition and mental methods.

Prior Learning (Y1 Skills)	Throughout the year children should be working on learning their 2, 5 and 10x tables in a range of different ways.	
• Count in multiples of 1, 2, 5 & 10. • Solve simple multiplication & division with apparatus & arrays. **Next Steps (Y3 Skills)** • Count from 0 in multiples of 4, 8, 50 & 100. • Recall & use multiplication & division facts for 3, 4, 8 tables. • Multiply: • 2-digit by 1-digit	3 x 2 = ○○○ ○○ 2 x 3 = ○○ ○○ ○○ *Group size x number of groups =* ○○ *product.*	Children will be shown that multiplication of two numbers can be done in any order (commutative) and will use arrays to represent this. *Physical objects/drawings used to aid working out.*
	3 x 5 = 15 *Mental recall. Children use prior learning of times tables.*	Children activate prior learning of times tables to know times tables facts.
	Key Vocabulary Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, *tens, units, value*	

Multiplication Year 3

Focus: Multiplying 2 digit numbers by 1 digit numbers

In year 3 children will move on from arrays and start using the grid method of multiplication. It is essential that before children move onto the grid method they are completely confident with all previous methods and have a solid grounding with mental methods and partitioning.

Prior Learning (Y2 Skills)	Before moving on to grid multiplication, children need to be able to …	
• Count in multiples of 2, 3 & 5 & 10 from any number up to 100. • Recall & use multiplication & division facts for 2, 5 & 10 tables. • Calculate & write multiplication & division calculations using multiplication tables. • Recognise & use inverse. **Next Steps (Y4 Skills)** • Count in multiples of 6, 7, 9, 25 & 1000.	Partition numbers into tens and units Multiply single digits by multiples of 10 (3 x 30 = 90). Quickly recall multiplication facts for the 2,3,4,5,6 and 10 x tables. Use any previous method to work out unknown multiplication facts, quickly and accurately.	
		Multiplication grid method requires good organization but also a solid understanding of partitioning and multiplication facts, as you can see in the example to the left for 35 x 7. The children need to remember that once they have multiplied the partitioned parts of the number, they then need to add the two

✗	30	5
7	210	35

210 + 35 = 245

• Recall & use multiplication & division facts all tables to 12x12.
• Multiply: • 2-digit by 1-digit • 3-digit by 1-digit
• Divide: • 3-digit by 1-digit

	7	9
x		3
2	3	7
	2	

Column multiplication. Children multiply the top digit by the bottom digit. Starting with the unit column first. Any number crossing ten requires the '1' digit to be carried under the line to the tens column and added in to the tens total.

Key Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, *partition, grid method, multiple, product, tens, units, value*

Multiplication Year 4

Focus: Multiplying 2 and 3 digit numbers by 1 digit numbers

In year 4 children need to use the grid method confidently to solve problems where a 2 or 3 digit number is multiplied by a one digit number. They need to move on to the use of short multiplication to solve 3 digit number multiplied by 1 digit problems.

Prior Learning (Y3 Skills)		Column multiplication 3 digit. Children multiply the top digit by the bottom digit. Starting with the unit column first. Any number crossing ten requires the '1' digit to be carried under the line to the tens column and added in to the tens total.
• Count from 0 in multiples of 4, 8, 50 & 100. • Recall & use multiplication & division facts for 3, 4, 8 tables. • Multiply: • 2-digit by 1-digit		
Next Steps (Y5 Skills) • Identify all multiples & factors, including finding all factor pairs. • Use known tables to derive other number facts. • Multiply: • 4-digits by 1-digit/ 2-digit • Divide: • 4-digits by 1-digit • Multiply & divide: • Whole numbers & decimals by 10, 100 & 1000	It is at this stage that approximation and estimation should become a regular part of classroom practice. Children should approximate an answer before using a method so they know if there answer is accurate or not. 253 x 9 is approximately 250 x 10 = 2500	
	Key Vocabulary Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, units, value, *inverse*	

Multiplication Year 5

Focus: Multiplying up to 4 digits by 1 or 2 digits

In year 5 children will continue to use short multiplication to solve increasingly richer problems that involve multiplying by 1 digit. They will then move on to long multiplication for problems that involve multiplying by 2 digits. Approximation will play an important part- with children making approximations before using long multiplication to help check their answer is correct.

Prior Learning (Y4 Skills)
• Count in multiples of 6, 7, 9, 25 & 1000.
• Recall & use multiplication & division facts all tables to 12x12.
• Multiply: • 2-digit by 1-digit • 3-digit by 1-digit
• Divide: • 3-digit by 1-digit

```
   Th  H   T   U
           5   3
   x       2   6
   _____
       3   1   8   ← Answer line 1
   _____
   1   0   6   0   ← Answer line 2
   _____
   1   3   7   8   ← Answer line 3
   _____
```

Column multiplication 2 digit x 2 digit. Children multiply the top digit by the bottom digit. Starting with the unit column first. Any number crossing ten requires the '1' digit to be carried under the line to the tens column and added in to the tens total.

Next Steps
• Understand and use place value for decimals, measures and integers of any size.

• Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions and mixed numbers, all both positive and negative.

Key Vocabulary
Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, units, value, inverse, *square, factor, integer, decimal, short/long multiplication, carry*

• Recognise and use relationships between operations including inverse operations.	

Multiplication Year 6

Focus: Consolidating short and long multiplication, multiplying decimals by 1 digit In year 6 children will consolidate all they know about short and long multiplication before they go to Secondary school. They will also learn the new skill of using short multiplication to multiply decimal numbers to 2 decimal places.

Prior Learning (Y5 Skills)		Write the calculation out correctly, ensuring that the units, tens, hundreds columns are lined up.
• Identify all multiples & factors, including finding all factor pairs.		First, multiply the units, 3(units) x 5 = 15, 1 ten and 5 units - put the 5 in the units column and the 1 in the tens column below the line.
• Use known tables to derive other number facts.		
• Multiply: • 4-digits by 1-digit/ 2-digit		Second, multiply the tens, 2(tens) x 5 = 10, add the 1 (from step 1) to make 11 (tens), put 1 in the tens column and 1 in the hundreds column below the line.
• Divide: • 4-digits by 1-digit • Multiply & divide:		
• Whole numbers & decimals by 10, 100 & 1000		Lastly, multiply the hundreds, 1(hundreds) x 5 = 5, add this to the 1 already in the 100's column from step 2 to make 6 and write this in the hundreds column.

Key Vocabulary
Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, units, value, inverse, *square, factor, integer, decimal, short/long multiplication, carry*
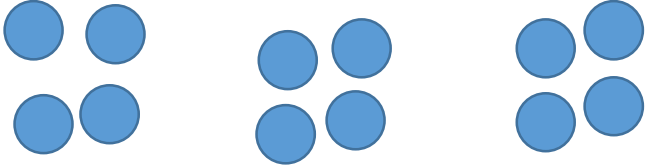
Division Year 1

Focus: Solve one step division problems.

Children in year 1 will begin to learn how to divide. They will work on simple division problems using tangible objects and pictorial recording.
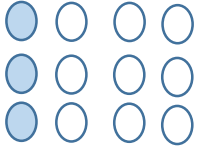
Prior Learning (EYFS Skills)		
• Separate a group of objects in different ways recognising that the total stays the same.		The children will start by sharing objects between set groups e.g. 12 sweets shared between 3 children. They will discuss how to share equally so no group has more or less.
Next Steps (Y2 Skills) • Count in multiples of 2, 3 & 5 & 10 from any number up to 100. • Recall & use multiplication & division facts for 2, 5 & 10 tables. • Calculate & write multiplication & division calculations using multiplication tables. • Recognise & use inverse.	**4 shared by 2 = 2**	The written sharing sentence will be modelled by the teacher and the children will start to copy onto whiteboards/into their books.
	4 shared by 2 = 2	Children will begin to use arrays to work out division sentences by drawing rings around each 'group'.
	Key Vocabulary Share, share equally, groups of, lots of, array, divide, divided by,	

Focus: Solve problems involving division

Children in year 2 will continue to work on basic division strategies and will learn that division is not commutative.

Prior Learning (Y1 Skills)	12 ÷ 3 = 4	Children will consolidate their understanding of division as sharing using objects and visual representations. They will then move on to division as grouping using objects such as bead strings.
• Count in multiples of 1, 2, 5 & 10. • Solve simple multiplication & division with apparatus & arrays.		
Next Steps (Y3 Skills) • Count from 0 in multiples of 4, 8, 50 & 100. • Recall & use multiplication & division facts for 3, 4, 8 tables. • Multiply: • 2-digit by 1-digit	12 ÷ 3 = 4 	Children will move on to recording by drawing arrays. For the example on the left they will start by drawing 3 rows and then keep adding one to each row until they get to 12. The number of columns gives them the answer.
	Key Vocabulary Share, share equally, one each, two each…, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line,	

Division Year 3

Focus: Dividing 2 digit numbers by 1 digit numbers moving from number line methods to short division
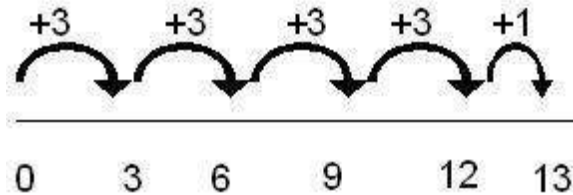
Children in year 3 will continue to use a number line to solve division problems and will begin to jump more than one step at a time in the style of 'chunking'. Once confident they will move on to short division without any remainders.

Prior Learning (Y2 Skills) • Count in multiples of 2, 3 & 5 & 10 from any number up to 100. • Recall & use multiplication & division facts for 2, 5 & 10 tables. • Calculate & write multiplication & division calculations using multiplication tables. • Recognise & use inverse.		Children will begin to use the grouping number line method to solve problems with remainders. They will start on zero and write the dividend at the end of their number line. They will jump in steps of the divisor until they get as close to the end as possible. Whatever is left over is the remainder. Using cubes or arrays alongside the number line will consolidate understanding.
Next Steps (Y4 Skills) • Count in multiples of 6, 7, 9, 25 & 1000. • Recall & use multiplication & division facts all tables to 12x12. • Multiply: • 2-digit by 1-digit • 3-digit by 1-digit • Divide: • 3-digit by 1-digit	$15 \div 3 = 5$ 1 x 3 = 3 2 x 3 = 6 3 x 3 = 9 4 x 3 = 12 **5** x 3 = 15	Children will activate prior learning of times tables to identify how many times the dividing number goes into the larger number. Eg. 15 ÷ 3 how many times does 3 divide into 15 (use times tables to calculate.

$$\begin{array}{r} 3\ 2 \\ 3\overline{)9\ 6} \end{array}$$

Once children are confident with number line methods then they should start work on short division. First of all arrays should be used be used to show a division calculation, the same calculation should then be shown in the short multiplication method. Place value should be regularly discussed so children realize that they are partitioning the dividend and dividing the units then then tens by the divisor.

Please Note:
Initially children will start with simple problems where each digit is a multiple of the divisor.

Key Vocabulary
Share, share equally, one each, two each…, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, *inverse, short division, carry, remainder, multiple*

Focus: Consolidating and extending use of short division

Children in year 4 will continue to use short division to solve division problems. They will begin to work on remainders, including problems where there are remainders in the first numbers but not in the final answer.

Prior Learning (Y3 Skills)		Once confident with the method of short division, 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. Children may need to use other equipment to calculate the division and multiplication facts required.
• Count from 0 in multiples of 4, 8, 50 & 100. • Recall & use multiplication & division facts for 3, 4, 8 tables. • Multiply: • 2-digit by 1-digit	$\dfrac{1\ 2}{8\ \big|\ 9^{1}6}$	
Next Steps (Y5 Skills) • Identify all multiples & factors, including finding all factor pairs.	$2\ 1\ 8$ $4\overline{)8\ 7^{3}2}$	Children who can use short multiplication problems with remainders (but not those in the final answer) are now ready to work on 3 digit problems. Again, there should be remainders in the calculation but never in the final answer.

• Use known tables to derive other number facts.
• Multiply:
• 4-digits by 1-digit/ 2-digit • Divide:
• 4-digits by 1-digit • Multiply & divide:
• Whole numbers & decimals by 10, 100 & 1000

$$0\ 3\ 5$$
$$5\ \overline{\smash{)}\ 1^1 7^2 5}$$

Once children are confident at dividing with 3 digits, they need to attempt problems where the answer in the first column (hundreds column) is a zero. They may wish to record the hundred initially as this will help them remember its place and the numbers value.

Key Vocabulary
Share, share equally, one each, two each…, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, *divisible by, factor*

Division Year 5

Focus: Extending use of short multiplication to 4 digits and remainders

Children in year 5 will use short division to solve problems up to 4 digits long. For the first time they will use short division to solve problems that have a remainder in the final answer.

Prior Learning (Y4 Skills)		In year 5 children will begin to solve
• Count in multiples of 6, 7, 9, 25 & 1000. • Recall & use multiplication & division facts all tables to 12x12. • Multiply: • 2-digit by 1-digit • 3-digit by 1-digit • Divide: • 3-digit by 1-digit	$$0\ 6\ 6\ 3\ r\ 5$$ $$8\overline{)5\ ^5 3\ ^5 0\ ^2 9}$$	division problems where a number up to 4 digits is divided by a single digit number including answers with remainders. These division problems need to be contextual so the children learn how to express the remainder- as a number, a fraction, a decimals, rounded up or rounded down.
Next Steps (Y6 Skills) • Understand and use place value for decimals, measures and integers of any size. • Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions and mixed numbers, all both positive and negative. • Recognise and use relationships between operations including	**Key Vocabulary** Share, share equally, one each, two each…, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, *quotient, prime number, prime factors, composite number (non-prime)*	

Division Year 6

Focus: Using short division to divide 4 digit numbers and express remainders as decimals and long division for dividing 2 digit numbers

In year 6, children will use short division to divide decimal numbers by single digit numbers. The final step of division will be long division which will be used to divide numbers by 2 digits.

Prior Learning (Y5 Skills)	The focus in year 6 is not so much the method of short division but how the remainders are expressed- children need to express remainders as decimals and fractions- depending on the context of the question.	
• Identify all multiples & factors, including finding all factor pairs. • Use known tables to derive other number facts. • Multiply: • 4-digits by 1-digit/ 2-digit • Divide: • 4-digits by 1-digit • Multiply & divide: • Whole numbers & decimals by 10, 100 & 1000		The remainder in this answer would have been 1 but it has been expressed as a decimal. To do this, children need to insert a decimal point next to the units and carry the remainder over the decimal point. Zeroes are inserted to the right of the decimal point to show that there was no value.
		To divide by 2 digit numbers, the children will use the method of long division. Any remainders would need to be expressed in a way that matched the context of the problem. Noting the multiples of 16 beforehand is crucial. Key vocabulary – How many sixteens fit in to 38? How many are left over?

Key Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, quotient, prime number, prime factors, composite number (non-prime), *common factor*

Year 6

Pupils use inverse operations and estimations to check calculations.