In order to encourage children to work mentally, calculations should always be presented horizontally so children can make decisions about how to tackle them.
Encourage children to choose to use the most efficient method for the numbers and the context. Teach operations together to emphasise the importance of inverse.

|	Objectives	Guidance	Addition	Subtraction	Vocabulary
			To be taught alongside each other		
Y5	Pupils will be taught to: add and subtract whole numbers with more than 4 digits, including using efficient 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. Solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25.	Pupils should practise using the efficient written methods of columnar addition and subtraction with increasingly large numbers to aid fluency. They should practise mental calculations with increasingly large numbers to aid fluency (e.g. 12 462 – 2 300 = 10 162).	Children should be taught to add **more than four digits**, including decimals **Number lines using efficient counting on** 4526ml + 3807ml = 8333ml = 8.333 litres + 1000 + 1000 + 1000 + 500 + 300 + 4 +3 4526 5526 6526 7526 8026 8326 8330 8333 ml 4526ml + 3000ml + 800ml + 7 ml **Compact Method** 3587 + 675 4262 6584 + 5848 12432 49.5 + 637.06 686.56 **Compensation** Children need to round and adjust to the nearest 10 / 100/1000 especially in the context of money. £4.95 + £6.80 + £9.14 = £5.00 – **5p** + £7.00 – **20p** + £9.00 + **14p** = £5.00 + £7.00 + £9.00 = £21.00 + **14p** – **25p** = **– 11p** = £21.00 – **11p** = £ 20.89 *Using similar methods, children will:* ✓ *add several numbers with different numbers of digits;* ✓ *begin to add two or more decimal fractions with up to three digits and the same number of decimal places;* ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m – 280 cm.*	Children should be taught to subtract using **more than four digits**, including decimals **Number lines and Difference** 'Find the difference by counting up' E.g. 754 - 586 or 21.4cm – 18.6cm = 18.6cm +___ = 21.4cm Where the numbers involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used. E.g. 1209 – 388 = 821 **Partitioning and decomposition** (only when secure using number lines) 600 140 14 700 + 50 + 4 - 200 + 80 + 6 400 + 60 + 8 = 468 **Decomposition** (Only when secure with the expanded form) 3 12 2 16 4 2 3 6 3000 1200 20 16 - 2 8 2 7 - 2000 800 20 7 = 1 4 0 9 1000 400 0 9 *Children should:* ✓ *be able to subtract numbers with different numbers of digits;* ✓ *begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places;* ✓ *know that decimal points should line up under each other* ✓ *encourage children to record in the most efficient way: just two steps.*	**ADDITION AND SUBTRACTION** add, addition, more, plus, increase sum, total, altogether score double, near double how many more to make...? subtract, subtraction, take (away), minus, decrease leave, how many are left/left over? difference between half, halve how many more/fewer is... than...? how much more/less is...? equals, sign, is the same as tens boundary, hundreds boundary units boundary, tenths boundary inverse
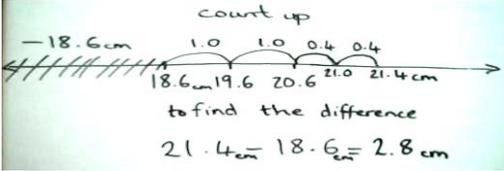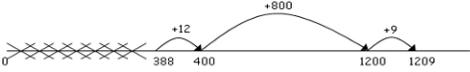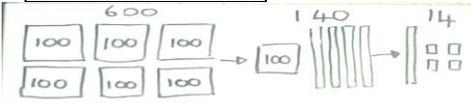
Encourage children to check results by using the inverse, using a different method e.g. equivalent calculation and by estimation where appropriate.

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	National Curriculum	Guidance	Multiplication To be taught alongside each other Division		Vocabulary

Y5	Pupils should be taught to:
	• identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
	• know and use the vocabulary of prime numbers, prime factors and composite (non-prime) 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
	• 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
	• multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
	• 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 addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
	• solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
	• solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25.
		Pupils should practise and extend their use of the efficient written methods of short multiplication and short division. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.
		
		They should use and understand the terms factor, multiple and prime, square and cube numbers.
		
		Pupils should interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (e.g. $98 \div 4 = 24$ r $2 = 24\frac{1}{2} = 24.5 \approx 25$).
		
		Pupils use multiplication and division as inverses to support the introduction of ratio in Year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres.
			Grid method (See Y4 to link grid method with arrays)
			Children should calculate TOxO mentally, with jottings (not grid). 3 and 4 digit x 1 digit numbers
			Short multiplication (multiplication by a single digit)
			Children will approximate first
			346×9 is approximately $350 \times 10 = 3500$
			
			$$\begin{array}{c|c|c|c} \times & 300 & 40 & 6 \\ \hline 9 & 2700 & 360 & 54 \end{array}$$
			$$\begin{aligned} & 2700 \\ + & 360 \\ + & 54 \\ \hline & 3114 \\ & \scriptstyle 1\,1 \end{aligned}$$
			
			Long multiplication (multiplication by more than a single digit)
			Children will approximate first
			72×38 is approximately $70 \times 40 = 2800$
			
			$$\begin{array}{c|c|c} \times & 70 & 2 \\ \hline 30 & 2100 & 60 \\ 8 & 560 & 16 \end{array}$$
			$$\begin{aligned} & 2100 \\ + & 560 \\ + & 60 \\ + & 16 \\ \hline & 2736 \\ & \scriptstyle 1 \end{aligned}$$
			
			Use Base 10 to model transition towards expanded written method e.g. $13 \times 11=$
			
			$$\begin{array}{c|c|c} \times & 10 & 3 \\ \hline 10 & 100 & 30 \\ 1 & 10 & 3 \end{array}$$
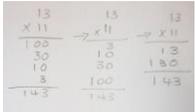			
			Expanded written method (most able children)
			*Children should multiply **decimals with one decimal place by a single digit number**, approximating first. They should know that the decimal points line up under each other.*
			4.9×3 is approximately $5 \times 3 = 15$
			
			$$\begin{array}{c|c|c} \times & 4 & 0.9 \\ \hline 3 & 12 & 2.7 \end{array}$$
			$$\begin{aligned} & 12 \\ + & 2.7 \\ \hline & 14.7 \end{aligned}$$
			
			Factorise to multiply by larger numbers
			eg. 35x14
			  35x (2x7)
			  (35x2) x7
			  70x7= 490
			
			Both expanded and contracted methods to be used only when children are confident with the Grid method.
				Children should calculate TO ÷ O mentally, with jottings, using knowledge of known facts.
				
				Short division HTO ÷ O Children can start to subtract larger multiples of the divisor, by x multiples of 10
				196 ÷ 6
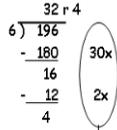				
				Answer: 32 remainder 4 or 32 r 4
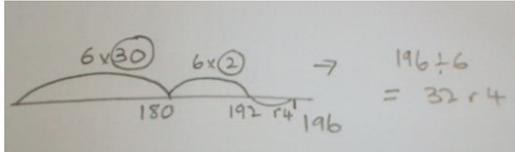				
				Solve division by chunking into known multiples of the divisor and illustrate on a vertical number line. (if children struggle return to Y4 and model chunking on a horizontal line)
				
				Any remainders should be shown as integers, then as fractions, i.e. if the children were dividing 32 by 10, the answer should be shown as 3.2 or 3 $\frac{2}{10}$ (which could then be written as 3 $\frac{1}{5}$ in it's lowest terms), depending on the context
				
				Children need to make sensible decisions about rounding up or down after division, according to the context.
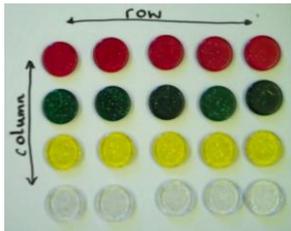				
				2000 ÷ 400
				2000 ÷ 4
				2000 ÷ 500
				2000 ÷ 5
				400 x 5
				500 x 4
				1/4 of 2000
				1/5 of 2000
				
				Known Facts
					lots of, groups of
					times, multiply, multiplication, multiplied by
					multiple of, product
					once, twice, three times… ten times… times as (big, long, wide… and so on)
					repeated addition
					array
					row, column
					double, halve
					share, share equally

Encourage children to check results by using the inverse, using a different method e.g. equivalent calculation and by estimation where appropriate.