Mornington Primary School

2017/2020

Lower KS2 Calculation Policy

At Mornington we have recognised the specific need of many of our children is to have a clear and consistent method to solve problems relating to each of the four operations. Due to this we have, as a school, devised a calculation policy that clearly sets out the expectations of children in each of the year groups, the written method they should use to solve a given problem and the progression they should expect to encounter. In this document you will find guidance to the type of questions your child is likely to face, examples of how your child would be asked in school to solve the problem and therefore allow you to confidently support your child and the school when completing work at home and examples of the type of vocabulary your child will be experiencing.

	Addition	
	In addition pupils will learn how to use the column method.	
	Year 3	**Year 4**
Process	• Whole numbers up to 1000 • Mainly 2 digit with carrying • 3 digit with carrying • Extension: moving onto decimals	• Whole numbers up to 10,000 • Carrying up to 1,000 • Extension: decimals to 1 decimal place • Adding several two digit numbers
Calc	145+38=183	174+247= 421 123.6 + 112.2 = 235.8 25+36+58=119

Examples	H T O
	  1 4 5
	+0 3 8
	  1 8 3
	    1 ← Carried ten is represented
	As 1 lot of ten in Ts column.
	
	Line the digits up under the correct heading H (hundreds), T (tens), O (ones). As in the example above a 0 can be used as a placeholder to show the second number has no Hs. Add the ones together and write the number under the line. If the two digits add to make 10 or more the ones are recorded in the ones column (as a 0 if 10 or a 3 in the case of the example where they add to make 13) and the tens is put under the answer (see above). It is then added to the total in the T column.
		25
		+ 36
		  58
		  119
		  11
		
		H T O
		2 4 7
		+1 7 4
		  4 2 1
		  1 1
		
		Add the digits in each column, always starting with the ones (O). If the numbers add to 10 or more the ones are put in the column you are working in and then the tens are carried to under the next column. For example in the tens (T) column 4+7+1(carried from the previous column)=12 the 2 stays in the T column and then 1 moves to under the H column.
		
		123.6
		+ 112.2
		  235.8

Vocabulary	+, Add, addition, more, plus, make, sum, total, altogether, score, double, near double, One more, two more, ten more, one hundred more… How many more make…? How many more is…than….? How much more is…? Is the same as. =, equals sign Tens boundary	Add, addition, more, plus, increase, sum, total, altogether, score, double, near double, How many more to make…? Is the same as. =, equals sign Tens boundary, hundreds boundary, inverse

Subtraction	
In subtraction pupils will learn to use the column method.	
Year 3	Year 4

	Year 3	Year 4
Process	• Column subtraction (two and three digits) • Decomposition from tens to ones only	• Column subtraction • Use of decimals • Zeros at the end of the top line
Calc	36-24=12 84-56=28	457-236=221 8.5-0.9=7.6 570-238=332

Examples	T O
	8 4
	- 5 6
	_____
	Lay the calculation out so that the T and O are correctly aligned. The bottom number needs to be taken from the top number. If the top number is smaller than the bottom number, it can not be done. Such as 4-6.
	
	T O
	₇8̷4
	- 5 6
	_____
	Here we take "1" (in this case 1 lot of ten) from the column immediately to the left of the column in need and reduce that number by 1. So 8 becomes 7.
	
	T O
	₇8̷₁4
	- 5 6
	_____
	.
	The ten that we took now is added onto the ones that are already there, so the 4 becomes 14 (4+10=14)
	
	T O
	₇8̷₁4
	- 5 6
	_2 8_
	You can now solve the problem.
	O (14-6=8) T (7-5=2). Giving the answer 28.
		457
		- 236
		_221_ 7₈̷¹.5
		     - 0.9
		     _7.6_
		
		Note: decimals must be lined up.
		
		⁶¹
		5₇̷0
		- 2 3 8
		_3 3 2_
		
		When there is an end zero follow the same process of taking from the next column "1", in this case 1 lot of 10, add this to the zero. 10+0=10 then continue with the calculation 10-8=2.

Vocabulary	-, subtract, subtraction, take (away), minus, leave, How many are left/left over? One less, two less....ten less...one hundred less... How many fewer is...than...? How much less is...than...? Difference between Half, halve Equals sign, equals, Is the same as... Tens boundaries, hundreds boundaries	Subtract, subtraction, take (away), minus, decrease, leave, How many are left/left over? How many more/fewer is...than...? How much more/less is...than...? Difference between Half, halve Equals sign, equals, Is the same as... Tens boundaries, hundreds boundaries, inverse

Multiplication

In multiplication pupils will learn to use column multiplication to multiply numbers beyond known times table facts.

	Year 3	Year 4
Process	• Introduction of layout to allow use of column multiplication • Chanting times tables using a metre stick to x12. • 2-digit numbers x 1-digit numbers • Solve missing number problems •	• Consolidate layout • Introduce hundreds, tens and ones (HTO x O) • Move onto thousands, hundreds, tens and ones (ThHTO x O) • Decimals x whole number (1dp)
Calc	23x8 =184 15x3=45 12 x ? = 24	215x2=430 2.2x4=8.8
Examples	$\begin{array}{r} 23 \\ \times\ \ 8 \\ \hline 184 \\ 2 \end{array}$ This calculation is explained step by step below, where letters have been used instead of numbers. $\begin{array}{r} AB \\ \times\ \ C \\ \hline GFD \\ E \end{array}$ The number sentence would be ABxC=GFD to represent 23x8=184 C is the number that multiplys against the other numbers (A and B). CxB=D (if the answer is a two digit number CxB=ED). So 8x3=24 the 4 is represented by D, the 2 moves below the answer line and is represented by E. Now CxA=F (if you used E add this to the answer F). If the answer is two digit number that is represented by GF. So 8x2=16 +2 (from the previous calculation) giving 18. Where the next two columns are filled in – in this case the tens and ones column. $\begin{array}{r} 15 \\ \times\ \ 3 \\ \hline 45 \\ 1 \end{array}$ Here the 3x5 gives 15, the T is carried to under the T column.	$\begin{array}{r} 215 \\ \times\ \ \ 2 \\ \hline 430 \\ 1 \end{array}$ $\begin{array}{r} 2.2 \\ \times\ \ \ 4 \\ \hline 8.8 \end{array}$ Note: When multiplying by a whole number keep the decimal point in line with the one from the question.
Vocabulary	Lots of… Groups of…. ×, times, multiply, multiply by, multiplication, multiple of, product Once, twice, three times…ten times Times as (big, long, wide….etc) (Eg 3 times as big) Repeated addition, array Row, column Double	Lots of… Groups of…. ×, times, multiply, multiply by, multiplication, multiple of, product Once, twice, three times…ten times Times as (big, long, wide….etc) (Eg 3 times as big) Repeated addition, array Row, column Double

	Division	
	In division pupils will learn to use long and short division to divide numbers beyond known times table facts.	
	Year 3	Year 4
Process	• Short division • Use of known times table facts • Introduction of remainders • Solve missing number problems	• Consolidate short division, outside known times table facts • Use of remainders
Calc	36÷3= 12 21÷3= 7 28÷3= 9 R1 14 ÷ ? = 2	56÷3=18 R2 37÷5=7 R2
Examples	36÷3= 12 1 3⟌3 6 How many times does the 3 divide into 3? The answer is then placed above the dividend being looked at. 1 2 3⟌3 6 The dividend (6) is now divided by the divisor (3). The answer is 2, which is put above the dividend. 21÷3= 7 0 3⟌2 1 If the dividend is too small for the divisor to divide into it a zero is placed over the dividend. 0 3⟌2 ²1 The two hasn't been divided yet; it must be carried over to the next digit. In this case a 1. It becomes 21 again. 0 7 3⟌2 ²1 The question remains as how many 3's divide into 21. 28÷3= 9 R1 0 9 R1 3⟌2 ²8 Here the process, the same as above, is carried out. However 3 can equally divide into 27, there is one left over. This is known as the remainder.	56÷3=18 R2 1 8 R2 3⟌5 6 37÷5=7 R2 0 7 R2 5⟌3 ³7
Vocabulary	Halve, Share, share equally One each, two each, three each… Group in pairs, threes….tens Equal groups of… ÷, divide, divided by, divided into Left, left over, reminder	Halve, Share, share equally One each, two each, three each… Group in pairs, threes….tens Equal groups of… divide, divided by, divided into Left, left over, reminder, factor, quotient, divisible by, inverse

Fractions and Percentages.		
This is to develop and support a conceptual understanding of calculating with fractions and percentages.		
	Year 3	Year 4
Process	Add and subtract fractions with the same denominator within one whole.	• Add and subtract fractions with the same denominator.
Calc	5/7 + 1/7 = 6/7 5/6 – 2/6 = 3/6	3/5 + 3/5 = 1 and 1/5 1 and 1/4 – 3/4 = 2/4 simplified to 1/2
Examples	5/7 + 1/7 = 6/7 Explaining that if the denominator is the same or 'like', it doesn't change and we just add the top numbers. 5/6 – 2/6 = 3/6 As with addition of fractions, the denominator needs to be the same or 'like' and we just subtract the numerators.	3/5 + 3/5 = 6/5 simplified to 1 and 1/5 If the answer has a numerator higher than the denominator, it can be simplified to a whole. (5/5 make 1 whole leaving 1 extra fifth) 1 and 1/4 – 3/4 = 1/2 Convert the whole to 4/4 then add the other 1/4 = 5/4 then subtract the 3/4 leaving 2/4. Which can be simplified to 1/2.
Vocabulary	Fraction, add, subtract, denominator, numerator, same, like, whole	Add, subtract, fractions, same, like, simplify, convert, denominator, numerator, whole, part.