Childcare, education and community services for all
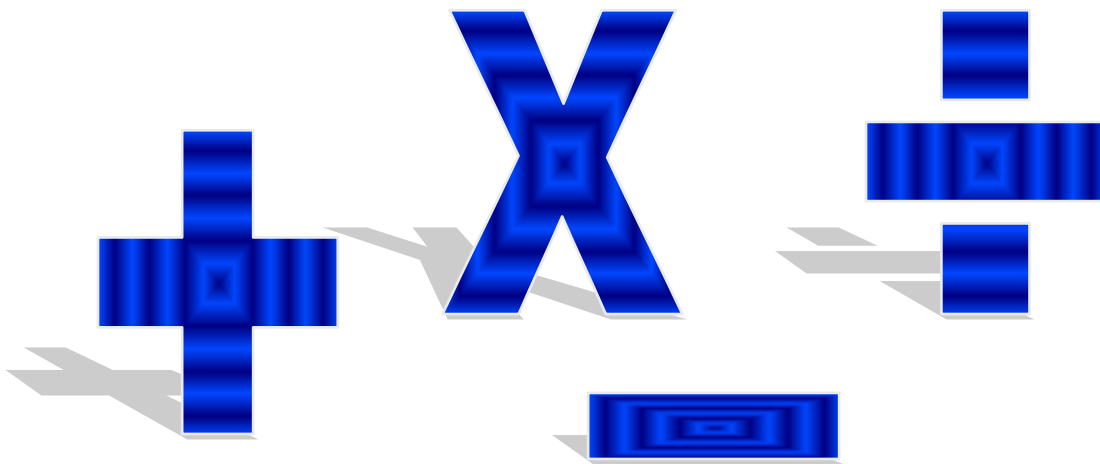
Bridgewater

Helping your child with calculations in year 6.

Calculation Policy for Parents.

This booklet has been designed as a guide for parents, to help them understand how the four operations (addition, subtraction, multiplication and division) are taught in our School.

The maths work your child is doing at school may look very different to the kind of 'sums' you remember. The teaching of maths is now about developing an understanding of number and not just knowing which kind of calculation to perform in a given situation. Initially children work through practical, oral and mental activities as children begin to understand these ideas they develop ways of recording to support their thinking. These informal methods become more efficient and succinct and lead to efficient written methods.

The calculation policy is organised according to age stage expectations as set out in the National Curriculum 2014, **however pupils will be taught according to the level that they are currently working at,** being moved onto the next level as soon as they are ready, or working at a lower stage until they are secure enough to move on. This means a pupil currently achieving below the average level is likely to be working at the level of year groups below, and vice versa for pupils working at above average levels. Please feel welcome to come and ask your child's class teacher to clarify with you the stages / methods your child is working on if you are unsure.

If your child gets 'stuck' on a particular stage it is always worth revisiting the previous stage or stages to review their understanding.

Talk to your child about how you work things out.

Ask your child to explain their thinking.

When faced with a calculation problem, encourage your child to ask...

1. Can I do this in my head?

2. Could I do this in my head using drawings or jottings to help?

3. Do I need to use a written method?

4. Do I need to use a calculator?

Also help your child to estimate and then check their answer. Encourage them to ask...

Is the answer sensible?

Addition – Add several numbers of increasing complexity

including money, measures and decimals with different numbers of decimal places.

Children are taught to understand addition as combining two sets or more and counting on.

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

When the children show a good understanding of number they will move on to the compact column method with carrying. The carried over number is written below the line. Also they can add a different number of digits together.

£	2	3●5	9	
+	£	7●5	5	
£	3	1●1	4	
		1 1 1		

Children can add different amounts of money together. Remind them to keep the decimal points lined up.

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

Children will add more than two decimal numbers with different numbers of digits. A zero is added to help to keep all the digits in the right columns.

Key number skills

Perform mental calculations, including with mixed operations and large numbers.

Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Read, write, order and compare numbers up to 10 million and determine the value of each digit.

Round any whole number to a required degree of accuracy.

Key vocabulary

add, more, plus, and, make, altogether, total, equal to,, equals, double, most, count on, number line, sum, tens, ones, partition, addition, column ,tens boundary, hundreds boundary, increase, vertical, 'carry', expanded, compact, thousands, hundreds, digits, inverse

decimal places, decimal point, tenths, hundredths, thousandths

Subtraction – Subtract with increasingly large and more complex numbers and decimal values

Children are taught to understand subtraction as taking away (counting back) and finding the difference (counting up).

$$5011 - 1997 = 3014$$

1997 2000   5000 5011
+3   +3000   +11
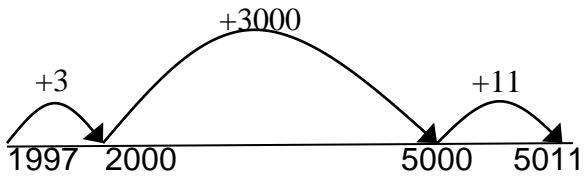
Counting on. If the numbers in a calculation are close together or near to a multiple of 10, 100 etc. children can use the counting on method. Starting from the smallest number and counting up to the largest number. Finding out how many are in between.

		0	9	
	14	16	16	
1	5	0	6	9	9
	8	9	9	4	9
	6	0	7	5	0

Children will use **column subtraction (decomposition)**. Children will exchange (borrow). They will subtract numbers with differing numbers of digits.

	0	10	14	13	11	
	1	0	5●4	1	9	kg
-		3	6●0	8		kg
		7	9●3	3	9	kg

Key number skills
Subtract numbers mentally with increasingly large numbers.
Use rounding and estimation to check answers to calculations.
Solve addition and subtraction multi-step problems in context, deciding which operations and best methods to use and why.
Read, write, order and compare numbers to at **least 1 million** and determine the value of each digit.
Count forwards or backwards in steps of 10, 100, 1000, 10,000...
Interpret negative numbers in context, counting forwards and backwards with positive and negative integers through 0.

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

Multiplication – multiply up to 4 digits by 1 or 2 digit numbers and multiply decimals with up to 2 decimal places by a single digit.

Children are taught to understand multiplication as repeated addition and scaling.

x 3000 400 60 4 9 | 27000 | 3600 | 540 | 36 | = 31176		The grid method develops children's understanding of the values of the numbers involved.

x   3000   400   60   4
 9 | 27000 | 3600 | 540 | 36 | =   31176
 3 | 9000 | 1200 | 180 | 12 | =   10392
                           41568
                             1
		The grid can be extended for the number of digits required. Again showing the value of each digit in the number.
		 This method can also be used with decimal numbers.

23
     X   8
        24
   +   160
       184
		The grid method moves onto a long multiplication layout.

23 X 8 184 2	Children need reminding here that they are working out 20 x 8, not 2 x 8.	Which quickly moves onto the short multiplication method as the children understand what is happening with the numbers.

72
 X   38
    16
   560
    60
 2 100
 2 736
     1
	7 2
	 x 3 8
	     5 7 6
	      5 1
	 2 1 6 0
	 2 7 3 6
	       1
		For calculations with TU x TU or HTU x TU children should use the long multiplication method.

Key skills	Key vocabulary
Identify multiples and factors, using knowledge of multiplication tables to 12x12. Solve problems where larger numbers are decomposed into their factors . Multiply and divide integers and decimals by 10, 100, 1000. Recognise and use square and cube	groups of, lots of, times, array, altogether, multiply, total, count up in, multiplied by, column, row, repeated addition, commutative, sets of, equal groups, _ times as big as, once, twice, three times etc. partition, grid method, multiple, product, tens, units, value square, factor, integer, decimal, short /

Division – Divide up to 4 digits by a single digit, including those with remainder answers.

Children are taught to understand division as repeated subtraction, sharing and grouping.

$$\begin{array}{r} 2\ 1\ 8 \\ \hline 4\,)\ 8\ 7\ 2 \\ -\ 8\ 0\ 0 \quad (\underline{200} \times 4) \\ \hline 0\ 7\ 0 \\ -\quad 4\ 0 \quad (\underline{10} \times 4) \\ \hline 3\ 2 \\ -\quad 3\ 2 \quad (\underline{8} \times 4) \\ \hline 0 \end{array}$$	Chunking **Top tip**: Children to subtract chunks they are most comfortable with Work out 2x $\qquad$ 5x $\qquad$ 10x

$4356 \div 5$ $$\begin{array}{r} 0\ 8\ 7\ 1\ \text{r}\,1 \\ \hline 5\,)\ 4\ ^4 3\ ^3 5\ 6 \end{array}$$ Answers can be as **a remainder** 871r1 Answer can be as **a fraction** $871\,^1/_5$ Answer can be as **a decimal** 871.2 by continuing the short division calculation after the decimal point. $$\begin{array}{r} 0\ 8\ 7\ 1\,.\,2 \\ \hline 5\,)\ 4\ ^4 3\ ^3 5\ 6\,.^1 0 \end{array}$$ Answer can be **rounded** 871	This will lead to short division but only when the children have a good understanding of the numbers. E.g. how many 3's are in 70. A link to multiplication would be beneficial here. Children will learn what to do with the remainder in a calculation so they can make the right choice of answer when solving problems.

$13032 \div 24 =$ Multiples of 24 $$\begin{array}{r} \quad\ 0\ \ 0\ \ 5\ \ 4 \\ \hline 24\ \big|\ 1\ \ 3\ \ 0\ \ 3\ \ 2 \\ -1\ \ 2\ \ 0 \\ \hline 1\ \ 0\ \ 3 \\ \underline{9\ \ 6} \\ 7\ \ 2 \\ \underline{7\ \ 2} \\ 0\ \ 2 \end{array}$$	Long division should be used when the divisor is a two-digit number. List all the multiples to aid in the calculation.

Multiples of 24:

2	4
4	8
7	2
9	6
1 2	0
1 4	4
1 6	8
1 9	2
2 1	6

Key skills
*Recall multiplication / division facts for all numbers up to 12 x 12.
*Identify multiples and factors of any number.
*Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
*Work out if numbers to 100 are prime, recalling primes to 19.
*Use multiplication and division as inverses.
*Express remainder answers as fractions, decimals or rounded numbers, as appropriate to the context of the problem.

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)