

Bewley Primary School



Calculation Policy

Children are introduced to the processes of calculation through practical, oral and mental activities. As children begin to understand the underlying ideas they develop ways of recording to support their thinking and calculation methods, use particular methods that apply to special cases, and learn to interpret and use the signs and symbols involved. Over time children learn how to use models and images, such as drawings, objects and empty number lines, to support their mental and informal written methods of calculation. As children's mental methods are strengthened and refined, so too are their informal written methods. These methods become more efficient and succinct and lead to efficient written methods that can be used more generally. By the end of Year 6 children are equipped with mental and written methods that they understand and can use correctly. When faced with a problem, children are able to make estimates, decide which method is most appropriate and have strategies to check its accuracy.

At whatever stage in their learning, and whatever method is being used, children's strategies must still be underpinned by a secure and appropriate knowledge of vocabulary (every day and mathematical) and number facts, along with those mental skills that are needed to carry out the process and judge if it was successful.

The overall aim is that when children leave primary school they:

- have a good understanding of the everyday and mathematical language associated with the four operations to enable them to interpret problems in context and make appropriate strategy selections;
- have a secure knowledge of number facts and a good understanding of the nature of the four operations;

- are able to use their knowledge and understanding to carry out calculations mentally and to apply general strategies;
- make use of diagrams and informal notes to help record steps and part answers when using mental methods that generate more information than can be kept in their heads;
- have an efficient, reliable, written method of calculation for each operation that they can apply with confidence when undertaking calculations that they cannot carry out mentally;

Mental methods

Oral and mental work in mathematics is essential, particularly so in calculation. Practical, oral and mental work, in all Year Groups lays the foundations by providing children with a good understanding of how the four operations build on efficient counting strategies and a secure knowledge of place value and number facts. Later work must ensure that children recognise how the operations relate to one another and how the rules and laws of arithmetic are to be used and applied. On-going oral and mental work provides practice and consolidation of these ideas.

The ability to calculate mentally forms the basis of all methods of calculation and has to be maintained and refined. A good knowledge of numbers or a "feel" for numbers is the product of structured practice and repetition. It requires an understanding of number patterns and relationships developed through directed enquiry, use of models and images and the application of acquired number knowledge and skills.

Secure mental calculation requires the ability to:

- recall key number facts instantly - for example, add and subtract 1-digit and 2-digit numbers to 20 ($9 + 9$, $18 - 9$), including zero, add three 1-digit numbers, recall and use number bonds and related subtraction facts within 20 (year 1).
- rapidly recall and use addition and subtraction facts to 20, recognise the place value of each digit in a 2-digit number (tens, ones), count in steps of 2, 3, 5 and 10, count in tens from any number, and give 10 more or less than a given number to 100, add and subtract numbers mentally including: a 2-digit number and ones, a 2-digit number and tens, two 2-digit numbers, recall multiplication and division facts for the 2, 5 and 10 multiplication tables (year 2).

- count in multiples of 2, 3, 4, 5, 8, 10, 50 and 100 from 0; give 10 or 100 more or less than a given number, recall and use multiplication and division facts for the 2, 3, 4, 5, 8 and 10 multiplication tables (year 3).
- read and write numbers to at least 10,000, recognise the place value of each digit in a 4-digit number (thousands, hundreds, tens, and ones), count in multiples of 2, 3, 4, 5, 6, 7, 8, 9, 10, 25, 50, 100 and 1000 from any given number, and 10 or 100 more or less than a given number, count forwards and backwards with positive and negative whole numbers through zero, accurately add and subtract numbers mentally including two 2-digit numbers, recall multiplication and division facts for multiplication tables up to 12×12 , mentally perform multiplication and division calculations quickly and accurately, including multiplying by 0 and dividing by 1 (year 4).
- read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit, count forwards or backwards in steps of 100, 1000 or 10,000 for any given number up to 1,000,000, add and subtract numbers mentally with increasingly large numbers, accurately multiply and divide numbers mentally drawing upon known facts (year 5).
- perform mental calculations, including with mixed operations and large numbers (year 6)

Written methods of calculation

The aim is that by the end of Key Stage 2, the great majority of children should be able to use an efficient method for each operation with confidence and understanding. The challenge for teachers is determining when their children should move on to a refinement in the method and become confident and more efficient at written calculations.

Children should be equipped to decide when it is best to use a mental or written method, based on the knowledge that they are in control of this choice. Once they are able to carry out all written and methods with confidence, calculators should be introduced near the end of KS2 to support pupils' conceptual understanding and exploration of more complex number problems.

Notes:

- *Children need to recognise that "ones" and "units" are both commonly used to discuss the numbers 0 to 9 and therefore both are used in this policy.*

- Children should understand that the = sign means "the same as" i.e. the resulting value on either side of the sign is the same e.g. $3 \times 4 = 48 \div 4$