

Subject Area - Maths

Rational Overview –

What does this subject look like at Chancel Primary School?

Maths at Chancel

At Chancel, Maths is one of the subjects that underpins our learning across the curriculum.

We follow the structure of the White Rose maths scheme and supplement this with resources from the Collins Busy Ants scheme of work and adapt both to suit the needs of our children. It has been developed to ensure coverage of the National Curriculum and engage, support and challenge children efficiently. We have also introduced daily arithmetic sessions that concentrate on the four operations and fractions to allow more time in maths lessons to be given to applying these skills through reasoning and problem solving.

To ensure clear progression and consistency throughout the school, we devised a Calculation Policy that outlines the methods taught for the four operations in each year group.

The Calculation Policy

The policy meets the requirements set out in the National Curriculum 2014 for the teaching and learning of mathematics. It has been developed by the mathematics subject leader and all teaching staff so that the understanding of mathematical principles and methods is consistent and progressive.

Expectations for progression

The calculation policy reflects the age-related expectations of the National Curriculum 2014. At Chancel we feel it is vital that children have complete accuracy in using an appropriate method, and are able to confidently use and apply their understanding of a given method before they move on. Only once this has been demonstrated and the teacher is confident that the child has mastered a particular method, will they move on to the next. Therefore, the set methods for each year group may not reflect the methods that every child in that group is using. Where appropriate, the CPA approach is used to ensure understanding before progressing to the next stage. Children (and adults!) can find maths difficult because it is abstract. The CPA approach builds on children's existing knowledge by introducing abstract concepts in a concrete and tangible way. It involves moving from concrete materials, to pictorial representations, to abstract symbols and problems.

Contextual application of methods

Children will be provided with 'real-life' scenarios so that they can see the value and relevance of learning an efficient method for calculating. Methods will also be practised regularly to ensure confidence and accuracy in application. This will help children to both value their learning and become more confident as independent mathematicians. Children will not progress to the next efficient method until they have demonstrated accuracy of method in using and applying and contextual problem solving.

Choosing and using a calculation method

Children will be encouraged to use a common process in deciding which calculation/s will be needed to solve a problem. This will ensure that they select the most appropriate method for the numbers involved. The following concepts must be taught from the earliest opportunity to ensure a firm grounding in logical reasoning and accuracy.

When presented with problem, children should answer the following questions:

- What am I being asked to calculate?
- Can I use any mental maths knowledge?
- Will jottings help me to work it out?
- Do I need to make use of a formal method?

Prior to calculating and when calculating:

- What would a sensible answer be close to? (Approximate)
- Is my method/calculation appropriate/accurate? (Calculate)
- Does my answer sound feasible? (Sensible)
- Can I use a method to check? (Inverse)

**Intent (overarching aims-
What skills do we wish our
pupils to acquire?)**

For every child to develop a sound understanding of Maths, equipping them with the skills of calculation, reasoning and problem solving that they need in life beyond school.

At Chancel we recognise that Maths is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment.

We provide a high-quality mathematics education with a mastery approach so that all children:

- become fluent in the fundamentals of mathematics;
- reason mathematically;
- can solve problems by applying their mathematics

Traditionally, Maths has been taught by memorising key facts and procedures, which tends to lead to superficial understanding that can easily be forgotten. At Chancel, we believe that children should be able to select which mathematical approach is most effective in different scenarios.

All pupils can achieve in mathematics! There is no such thing as a 'Maths person', there is the belief that some pupils can do maths and others cannot. A typical maths lesson will provide the opportunity for **all** children, regardless of their ability, to work through fluency, reasoning and problem solving activities.

By building confidence, resilience and a passion for maths, we can show that whatever their prior experience or preconceptions, maths is an exciting adventure that everyone can enjoy, value and master!

To ensure progression in maths, in our Calculation Policy we have outlined which maths skills need to be mastered by the end of each phase.

Expectations for the end of each phase

End of KS1

Addition

- Add three single-digit numbers (e.g. $5 + 9 + 7$)
- Add a 2 digit number and ones (e.g. $27 + 6$)
- Add a 2 digit number and tens (e.g. $23 + 40$)
- Add pairs of 2-digit numbers (e.g. $35 + 47$)
- Show that adding can be done in any order (the commutative law). Recall bonds to 20 and bonds of tens to 100 ($30 + 70$ etc.) Count in steps of 2, 3 and 5 and count in tens from any number. Understand the place value of 2-digit numbers (tens and ones)

Compare and order numbers to 100 using $<$ $>$ and $=$ signs.
Read and write numbers to at least 100 in numerals and words.

- Solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures, and applying mental and written methods.

Subtraction

- Recognise the place value of each digit in a two-digit number.
- Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100.
- Subtract using concrete objects, pictorial representations, 100 squares and mentally, including: a two-digit number and ones, a two-digit number and tens, and two two-digit numbers.
- Show that subtraction of one number from another cannot be done in any order.
- Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems.
- Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representation, and also applying their increasing knowledge of mental and written methods.
- Read and write numbers to at least 100 in numerals and in words.

Multiplication

- Count in steps of 2, 3 and 5 from zero, and in 10s from any number. Recall and use multiplication facts from the **2, 5 and 10** multiplication tables, including recognising odds and evens.
- Write and calculate number statements **using the $\times$ and $=$ signs**. Show that multiplication can be done in any order (commutative). Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts.
- Pupils use a variety of language to discuss and describe multiplication.

Division

- Count in steps of 2, 3, and 5 from 0
- Recall and use multiplication and division facts for the **2, 5 and 10** multiplication tables, including recognising odd and even numbers.
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the $\times$, $\div$ and $=$ signs.
- Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

End of LKS2

Addition

- Select most appropriate method: mental, jottings or written and explain why. Recognise the place value of each digit in a four-digit number. Round any number to the nearest 10, 100 or 1000. Estimate and use inverse operations to check answers. Solve 2-step problems in context, deciding which operations and methods to use and why.
- Find 1000 more or less than a given number.
- Continue to practise a wide range of mental addition strategies, ie. number bonds, add the nearest multiple of 10, 100, 1000 and adjust, use near doubles, partitioning and recombining.
- Add numbers with up to 4 digits using the formal written method of column addition

Solve 2-step problems in contexts, deciding which operations and methods to use and why.

- Estimate and use inverse operations to check answers to a calculation.

Subtraction

- Subtract by counting on where numbers are close together or they are near to multiples of 10, 100 etc.
- Children select the most appropriate and efficient methods for given subtraction calculations.
- Estimate and use inverse operations to check answers.
Solve addition and subtraction 2-step problems, choosing which operations and methods to use and why.
- Solve simple measure and money problems involving fractions and decimals to two decimal places.
- Find 1000 more or less than a given number.
- Count backwards through zero, including negative numbers.
Recognise place value of each digit in a 4-digit number Round any number to the nearest 10, 100 or 1000
- Solve number and practical problems that involve the above, with increasingly large positive numbers.

Multiplication

- Count in multiples of 6, 7, 9, 25 and 1000
- Recall multiplication facts for all multiplication tables up to 12×12 .
- Recognise place value of digits in up to 4-digit numbers
- Use place value, known facts and derived facts to multiply mentally, e.g. multiply by 1, 10, 100, by 0, or to multiply 3 numbers.
- Use commutativity and other strategies mentally $3 \times 6 = 6 \times 3$, $2 \times 6 \times 5 = 10 \times 6$, $39 \times 7 = 30 \times 7 + 9 \times 7$.
- Solve problems with increasingly complex multiplication in a range of contexts.
Count in multiples of 6, 7, 9, 25 and 1000
- Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones).

Division

- Recall multiplication and division facts for all numbers up to 12×12 .
- Use place value, known and derived facts to multiply and divide mentally, including: multiplying and dividing by 10 and 100 and 1.
- Pupils practise to become fluent in the formal written method of short division with exact answers when dividing by a one-digit number
- Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example $200 \times 3 = 600$ so $600 \div 3 = 200$
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as three cakes shared equally between 10 children.

End of UKS2

Addition

- Perform mental calculations, including with mixed operations and large numbers, using and practising a range of mental strategies.
Solve multi-step problems in context, deciding which operations and methods to use and why.
- 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.
- Pupils understand how to add mentally with larger numbers and calculations of increasing complexity.

Subtraction

- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.
- 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
Use negative numbers in context, and calculate intervals across zero.
- Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate.

Multiplication

- Recall multiplication facts for all times tables up to 12×12
- Multiply multi-digit numbers, up to 4-digit $\times$ 2-digit using long multiplication. Perform mental calculations with mixed operations and large numbers.
- Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods.
- Estimate answers using round and approximation and determine levels of accuracy.
Round any integer to a required degree of accuracy.

Division

- Recall and use multiplication and division facts for all numbers to 12×12 for more complex calculations
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. Use short division where appropriate.
- Perform mental calculations, including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers.
- Solve problems involving all 4 operations.
- Use estimation to check answers to calculations and determine accuracy, in the context of a problem.
- Use written division methods in cases where the answer has up to two decimal places.
- Solve problems which require answers to be rounded to specified degrees of accuracy.