# CHOWBENT PRIMARY SCHOOL

## Mathematics Policy

Date policy agreed by Governing body:

5th March 2024

Signed Mrs S Heapy Chair

## Purpose

Mathematics teaches children how to make sense of the world around them through developing their ability to calculate, reason and solve problems. It enables children to understand relationships and patterns in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics.

The National Curriculum for mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time so that pupils can develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **Reasoning** mathematically by following a line of enquiry, conjecturing relationships and generalisations and developing an argument, justification or proof using mathematical language.
- **Solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeing solutions.

## Aims

At Chowbent Primary the aims of teaching mathematics are:

- To promote enjoyment of learning through practical activity, investigation, exploration and discussion.
- To promote confidence and competence with numbers and the number system.
- To develop the ability to solve problems through decision-making and reasoning in a range of contexts.
- To develop a practical understanding of the ways in which information is gathered and presented.
- To explore features of shape and space and develop measuring skills in a range of contexts.
- To understand the importance of mathematics in everyday life.
- To develop the correct use of mathematical vocabulary and language.
- We aim to ensure that all children leave Key Stage 2 having reached their full potential in mathematics.

## Objectives

The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

### Key stage 1 - years 1 and 2

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools].

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

## Lower key stage 2 - years 3 and 4

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the 4 operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word-reading knowledge and their knowledge of spelling.

## Upper key stage 2 - years 5 and 6

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all 4 operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

**The Mathematics Curriculum**

| | YR | Y1 | Y2 |
|---|---|---|---|
| AUTUMN TERM | Counting<br>Subitising up to 5<br>Matching and comparing amounts<br>Comparing size, mass & capacity<br>Exploring pattern<br>Composition of 1, 2 and 3<br>2D shape: circles and triangles, rectangles and squares<br>Positional language<br>Representing numbers to 5.<br>One more/one less. | Counting, reading and writing amounts, numerals and words within 10 and 20<br>Finding 1 more/1 less<br>Addition and subtraction within 10/20.<br>Number bonds within 10/20<br>Counting in 2's<br>2D and 3D shapes<br>Money – recognition and problem solving<br>Days/months – daily calendar | Place value – two digit numbers<br>Problem solving<br>Addition and subtraction – two digit numbers<br>Fractions, including simple fractions |
| SPRING TERM | Representing numbers from 6 to 10<br>Comparing quantities up to 10<br>Composition of numbers up to 10<br>Mass, height and length<br>Number bonds to 5 and 10<br>2D and 3D shapes | Counting, reading and writing numerals within/beyond 20.<br>Place value within 100 (tens/units)<br>Counting in 5's/10's.<br>Days/months – daily calendar<br>Money – recognition and problem solving<br>Position and direction – Beebots<br>Fractions | Multiplication and division –<br>2, 5 and 10 times tables<br>Commutative multiplication<br>Shape and position – properties of 2D and 3D shapes, rotations and angles<br>Time – writing the time to five minutes on a clock face |

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| SUMMER TERM | Building numbers beyond 10<br><br>Counting patterns beyond 10<br>Spatial reasoning: matching, rotating and manipulating<br><br>Addition<br><br>Subtraction<br><br>Doubling<br><br>Sharing and grouping<br><br>Odd and even numbers | Counting, reading and writing numerals within/beyond 20.<br><br>Multiplication and division (arrays)<br><br>Counting in 5's/10's.<br><br>Days/months – daily calendar<br><br>Money – recognition and problem solving<br><br>Measurement – length and height, capacity and volume<br><br>Time - sequencing clocks.<br><br>Fractions (revisiting) | Measurement – compare and order lengths, mass, volume/capacity<br><br>Statistics – pictograms, tally charts, block diagrams and simple tables<br><br>Statistics – ask and answer questions about totaling and comparing categorical data |

| | Y3 | Y4 | Y5 | Y6 |
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| AUTUMN TERM | **Number and place value**<br>Representing numbers using a variety of concrete, pictorial and abstract methods<br><br>**Addition & subtraction**<br>Mental strategies (number bonds, doubles, near doubles, rounding) to add and subtract.<br><br>**Multiplication & division**<br>Multiplication by representing in groups, arrays, repeated addition. Multiplication is commutative and related multiplication and division facts. | **Number and place value**<br>Partitioning in non-standard ways, using <, > and = symbols to compare numbers, counting backwards past 0, reading/writing Roman numerals.<br><br>**Addition & subtraction**<br>Checking addition and subtraction calculations using the inverse operation, formal methods of addition and subtraction.<br><br>**Multiplication & division**<br>Multiplication by representing in groups, arrays, repeated addition. Written methods of multiplication and division. | **Place value**<br>Understanding place value in numbers to 1,000,000, estimating numbers on number lines and empty number lines and rounding numbers.<br><br>**Addition & subtraction**<br>Column addition/subtraction involving numbers over 4 digits involving carrying/borrowing.<br><br>**Multiplication and division**<br>Multiples, factors and prime numbers, develop fluency for multiplication and division formal methods. Solve problems involving all calculations. | **Place value**<br>Reading, writing, ordering and comparing numbers up to 10 000 000, multiplying and dividing numbers by 10, 100 and 1 000 up to three decimal places.<br><br>**Addition and subtraction**<br>Performing mental calculations, including with mixed operations and large numbers<br><br>**Multiplication and division**<br>Multiplying multi -digit numbers up to 4 digits by a two - digit whole number using the formal written method of long multiplication and dividing numbers up to 4 - digits by a two - digit whole number using the formal written method of short division where appropriate |

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| | | | **Statistics**<br>Using data gathered in geography to construct tables and charts.<br>Analyse and interpret data and answer comparison, sum and difference questions. | **Statistics**<br>Interpreting and constructing pie charts and line graphs and use these to solve problems, involving selecting, processing, presenting and interpreting data, constructing and interpreting frequency tables, bar charts with grouped discrete data, and line graphs and pie charts. |
| SPRING TERM | **Fractions and Decimals**<br>denominators, numerators and the whole of a fraction, equivalent fractions, counting in tenths and hundredths, decimal fraction equivalences for a half, one quarter and three quarters.<br><br>**Measure**<br>Measuring length, perimeter, mass, capacity and volume | **Fractions and Decimals**<br>comparing and ordering fractions, finding fraction decimal equivalences for tenths and hundredths, rounding decimal numbers.<br><br>**Measure**<br>Measuring length, convert units of length, perimeter using the algebraic formula 2(a+b), mass, convert and capacity and volume. | **Fractions**<br>comparing and ordering fractions, adding and subtracting fractions with the same denominator and multiples of the same number, recognising mixed numbers and improper fractions and convert, reading and writing decimal numbers as fractions (e.g. 0.71 = / 71/100) and multiplying proper fractions and mixed numbers by whole numbers. | **Fractions**<br>Comparing and ordering fractions including fractions >1, simplifying fractions, calculating decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8 ), adding and subtracting fractions with different denominators |

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| | **Time**<br>Telling the time to the nearest minute in words/analogue, converting between analogue and digital times and between 12 and 24 hour clock. | **Time**<br>Understanding intervals of time and convert between them (seconds, minutes hours, days, weeks, months, years) | **Decimals**<br>recognising and using thousandths, writing, ordering and comparing numbers with up to three decimal places, rounding decimals with two decimal places to the nearest whole number and to one decimal place, reading and writing decimal numbers as fractions.<br><br>**Area & perimeter**<br>calculating and comparing the area of squares and rectangles, estimating the area of irregular shapes, measuring and calculating the perimeter of composite rectilinear shapes, missing lengths and angles<br><br>**Percentages**<br>Know that per cent relates to “number of parts per hundred”, writing percentages as a fraction and solving problems: percentage and decimal equivalence | **Decimals**<br>Multiplying one - -digit numbers with up to two decimal places by whole numbers, identifying the value of each digit to three decimal places and multiplying and dividing numbers by 10, 100 and 1000 where the answers are up to three decimal places.<br><br>**Area and perimeter**<br>Recognising that shapes with the same areas can have different perimeters and vice versa and calculating the area of parallelograms and triangles<br><br>**Percentages**<br>Finding fractions and percentages of whole -number quantities, solving problems involving the calculation of percentages and the use of percentages for comparison |

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| SUMMER TERM | **Geometry Shape & Position**<br>3D shape orientations, angles (property of shape), angles greater than/less than a right angle, horizontal/vertical lines and pairs of perpendicular/ parallel lines<br><br>**Statistics**<br>pictograms, line charts and bar charts, including interpreting data<br><br>**Money**<br>Counting totals of money and converting between pounds and pence, understanding money as decimals. | **Geometry Shape & Position**<br>shape orientations, angles as a property of shape, angles greater than or less than a right angle, horizontal/vertical lines and pairs of perpendicular and parallel lines<br><br>**Statistics**<br>pictograms, line charts and bar charts, including interpreting data<br><br>**Money**<br>Making combinations of money using different amounts, adding and subtracting money, including calculating change | **Geometry Shape & Position**<br>Identifying 3D shapes from 2D representations, drawing and measuring angles, , distinguishing between regular/irregular polygons, estimating and comparing acute, obtuse and reflex angles, identifying angles at a point and on a straight line, reflections and translations<br><br>**Measures**<br>estimating volume and capacity, using all four operations to solve problems involving measure (e.g. length, mass, volume, money) and solving problems involving converting between units of time. Converting between different units of metric measure and use equivalences between metric units and common imperial units such as inches, pounds and pints | **Shape**<br>Measuring and classifying angles, Calculating angles, vertically opposite angles, angles in a triangle, angles in a quadrilateral and angles in polygons.<br><br>**Projects**<br>Revisiting skills and curriculum content covered both in Year 6 and the rest of KS2. Exploring real life contexts, allowing children to see how important maths is in all aspects of life. Opportunities can be created to explore and develop enterprise. |

**Teaching and Learning**

Mathematics is a core subject. The fundamental mathematical skills knowledge and concepts of the subject are set out in the National Curriculum. At Chowbent, a long-term plan organises the units of work and curriculum. Following close scrutiny of assessments, a precise plan is made which is followed so that the teaching is carefully geared to meet the children's needs.

Weekly plans are completed which reflect progressive steps in learning across the lesson/unit of work. Additionally, mathematics is incorporated into a range of cross-curricular subjects where appropriate.

To ensure that all pupils have access to a broad and balanced mathematical curriculum, our teaching will:

- have a high profile of interactive teaching and learning throughout the lesson
- encourage the development of mathematical interaction between the
- teacher and pupil, and pupil and pupil
- lay emphasis on the development of mental calculation strategies and their verbalisation
- follow the agreed calculation policy to ensure progression across the school
- encourage the use of manipulative (practical equipment) and models and
- images to aid understanding (see calculation policy)
- engage all learners through differentiated activities using steps in learning
- include (where appropriate) the use of ICT to enhance teaching and learning

**Year 1 - Year 6**

Mathematics is taught as a discreet subject from Year 1 to Year 6, although cross-curricular work may include mathematical activities.
For example; measurement in DT and Science; developing the use of spreadsheets in computing; shape and movement within Physical Education and a sense of the passage of time within History. Children record arithmetic methods in jotters or on whiteboards.

**This model is followed for each of the areas/topics:**

**STAGE 1**

Discrete teaching

**STAGE 2**

Provide opportunities for children to solve problems within or at the end of a unit to deepen learning and extend vocabulary. Children will be encouraged to use the maths investigation prompts as an aid – (see appendix for A4 copy).

**STAGE 3**

Evaluate by drawing out the strategy used and pinpoint any common errors (We may refer to the maths investigation prompts as an aid).

**Marking and Feedback**
(see marking and feedback policy for full details)

'Steps in Learning' stickers will only be used and marked against during Stage 1 of our maths teaching structure. The same sticker will be used for the whole of stage 1 and ticked/dated appropriately (see example below)

**There is no need to repeatedly print out and use new stickers for every lesson!**

Steps to Success

7)I can compare and order decimals

6) I can round decimals

5) I can write thousandths as decimals

4) I can understand the concept of thousandths

3) I can express more complex fractions as decimals

2)I can express simple fractions as decimals

l)I can read and write decimals with 2 decimal places

**Homework**

Homework is used to support Mathematics through:

- the learning of number bonds from Year 1 onwards
- the learning of times tables
- recall of number facts
- weekly homework set throughout the school with additional homework as appropriate
- online platforms. E.g. SATs Companion, TT Rockstars, Numbots, etc.

**The Foundation Stage (EYFS)**

In accordance with the Statutory Framework for the Early Years Foundation Stage, class teachers provide opportunities for all children to develop their understanding of problem solving. reasoning and numeracy through both child and teacher-initiated activities, as appropriate for the stage of development for the child.

Daily mathematics lessons are delivered based on a long-term plan and targets are set for children based on 1:1/small group observations and assessments. We provide all children with daily opportunities to develop their understanding of number, measurement, pattern, shape and space through continuous provision where varied activities are planned that allow the children to enjoy, explore, practise and talk confidently about mathematics and develop their next steps. Baseline assessment is used rigorously to identify specific learning targets. The teacher will work 1:1 with a child or in a small group situation and the opportunity to master skills will be given in these sessions and within continuous provision.

**EQUAL OPPORTUNITIES**

All children regardless of their race, sex, religious belief or ability will be given equal opportunities to develop their knowledge, skills and understanding of mathematics.

**SEND**

Pupils with Special Educational Needs in mathematics are able to be accommodated through an appropriate programme of work to meet their needs. E.g. Through tailored support plans, precision teaching or intervention programmes. Differentiation is used where we feel that it enhances the children's learning, providing SEND children with carefully targeted work in a smaller group situation.

**MORE ABLE/GIFTED AND TALENTED**

Differentiation enables the children to access the precise learning that they need and allows for challenge towards greater depth. The school's structured model to teaching maths encourages a systematic approach which encourages and provides opportunity to engage children in greater depth activities.

**Excellence in mathematics is celebrated** in display and performance including:

- display of good quality work
- recognition of individual achievements in 'Chowbent Champ' assemblies (certificates and ‘Marvellous Mathematician’ trophy
- recognition of individual achievements in plenary sessions
- photographs shared on Class Story

**Assessment**
Assessing mathematics is an integral part of teaching and learning and central to good practice. It should be process orientated reviewing the way that techniques and skills are applied purposefully by pupils to demonstrate their knowledge and understanding and skills that they have developed during a particular unit. As assessment is part of the learning process it is essential that pupils are closely involved.

Assessment can be broken down into:

- *Formative assessments* which are carried out during and following short, focused tasks and activities. They provide pupils and teaching staff with the opportunity to reflect on their learning in the context of the agreed success criteria. This feeds into planning for the next lesson or activity. End of year expectation records are used to record progress as well as to self and peer assess.

- *Summative assessment* should review pupils' capability and provide a best fit level. Use of independent open-ended tasks provide opportunities for pupils to demonstrate capability in relation to the term's work. There should be an opportunity for pupil review and identification of next steps. Summative assessment should be recorded for all pupils showing whether the pupils have met, exceeded or not achieved the learning objectives. Teachers will use assessments to form a judgement as to whether each child has met the objectives for each unit within their year group. Evidence of work will be available in children's books, on photographs, videos and notes on discussions with children etc. This will demonstrate achievement of objectives.

End of term assessments take place from Y1 to Y6 and consist of an arithmetic and a reasoning paper.

| | **Arithmetic paper** | **Reasoning paper** | **Time allocated** | **School expected standard *(Combined scores on both papers)*** | **School greater depth standard** |
|---|---|---|---|---|---|
| **Year 1 Autumn, Spring and Summer terms** | 10 marks | 15 marks | Not timed | 14 or more out of 25<br><br>(56%+) | 21 or more out of 25 (84%+) |
| **Year 2 Autumn term** | Past SATs paper | Past SATs paper | Not timed | 35 or more out of 60<br><br>(58%) | 51 or more out of 60 (85%) |
| **Year 2 Spring and Summer terms** | Past SATs paper | Past SATs paper | Not timed | 35 or more out of 60<br><br>(58%) | 35 or more out of 60 (58%) |

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| **Year 3 Autumn, Spring and Summer terms** | 20 marks | 30 marks | 25 minutes (arithmetic) 50 minutes (reasoning) | 28 or more out of 50 (56%+) | 42 or more out of 50 (84%+) |
| **Year 4 Autumn, Spring and Summer terms** | 20 marks | 30 marks | 25 minutes (arithmetic) 50 minutes (reasoning) | 28 or more out of 50 (56%+) | 42 or more out of 50 (84%+) |
| **Year 5 Autumn and Spring terms** | 20 marks | 30 marks | 25 minutes (arithmetic) 50 minutes (reasoning) | 28 or more out of 50 (56%+) | 42 or more out of 50 (84%+) |
| **Year 5 Summer term** | 20 marks | 35 marks | 25 minutes (arithmetic) 50 minutes (reasoning) | 31 or more out of 55 (56%+) | 47 or more out of 55 (85%) |
| **Year 6 Autumn, Spring and Summer terms** | Past SATs papers arithmetic (1) | Past SATs papers – Reasoning (1) and (2) | Arithmetic (1) (30 minutes) Reasoning (1) (40 minutes) Reasoning (2) (40 minutes) | SATs marking scheme | SATs marking scheme |

**Formative summative assessments** are carried out at the end of each National Curriculum Key Stage through the use of SATS and/or teacher assessment.

Results from whole school summative assessments inform the school action plan through the SEF (school self-evaluation form) and the SIP (school improvement plan)

**Monitoring and review**

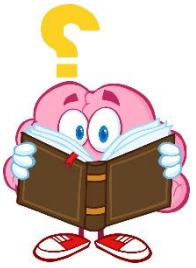
Monitoring will support the self-evaluation process, identifying areas of strength as well as those for development. The mathematics subject leader is responsible for the monitoring of this policy. Areas for development will be incorporated into the School Improvement Plan as necessary.

Through monitoring the coordinator will:

- Ensure that there is clear progression throughout the school
- Analyse assessment data and pupil progress
- Identify any training needs and offer extra support and guidance to staff when it is appropriate
- Ensure that there are suitable resources to help with the teaching and learning of mathematics
- Keep up-to-date with developments in mathematics education and disseminate information to colleagues as appropriate
- Share new initiatives and good practice

**MATHS Investigation Prompts**

What do you know already?



Could I use trial/error?


Would it help to be systematic/organised?

Have I done this before?

What visual/concrete resources would help me?

Can I learn from observing other people's approaches?