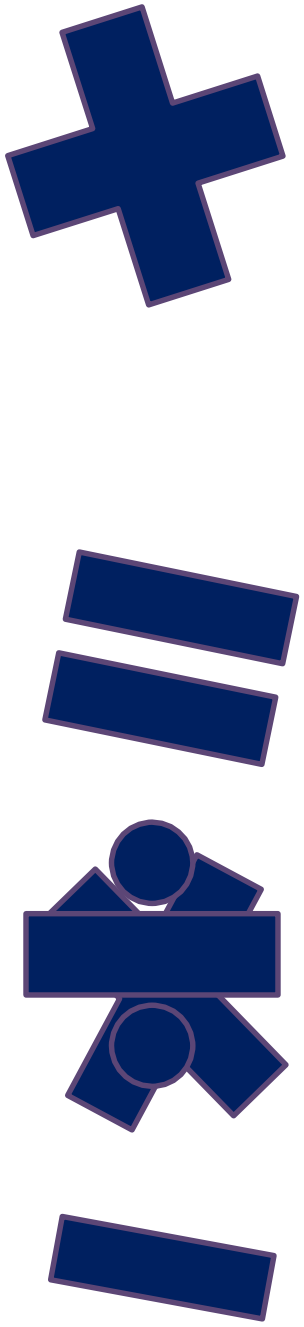
Year 4 Progression Long Term Plans Key Concepts

National Curriculum 2014



Purpose of Study – National Curriculum 2014

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Aims

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 have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- **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.

Who is this book for?

The purpose of this booklet is to outline the expected progression for each year group from the new framework for mathematics. It is important that this is used to ensure that the correct pitch of lessons is achieved alongside suitable differentiation for learning. It is designed to support the 2014 National Curriculum for Mathematics at Key Stages 1 and 2.

This booklet will be relevant and useful for all the following at Brodetsky Jewish Primary School:

- Class Teacher
- Teaching Assistants/Learning Support Assistants
- Volunteers
- Supply Staff
- Parents

Resources

In Years 3-6 planning will be based on the White Rose Maths Hub mastery schemes of learning, which combines the Singapore pedagogy with leading UK expertise and is correlated to the new National Curriculum.

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Overview of Progression in Year 4

Number and place value

In Year 4, children use place value in four-digit numbers, such as 3742 is three thousands, seven hundreds, four tens and two ones. They learn to count in 6s, 7s, 9s, 25s and 1000s, and say 1000 more or less than a specific number. They encounter negative numbers by counting back past zero on number lines, and continue work on rounding (to the nearest 10, 100 or 1000) and estimation. Children are introduced to Roman numerals to 100 and find out how the number system has changed over time.

Addition and subtraction

Children extend previous years' work by adding and subtracting numbers with up to four digits, using mental and written methods, including columnar addition and subtraction. They keep practising mental methods of addition and subtraction as well as written methods, performing calculations increasingly quickly and confidently. They continue using estimation as well as inverse operations to help check answers.

Multiplication and division

Children learn the remaining multiplication tables up to the 12 multiplication table, and use facts from the tables to solve increasingly complex multiplication and division problems. They build on their work with mental methods of calculation in Year 3, using their knowledge of place value and number facts to multiply and divide confidently. They begin to use a formal written layout for multiplication when multiplying two-digit and three-digit numbers by one-digit numbers.

Fractions (including decimals)

Developing ideas from Year 3, children confidently count up and down in hundredths. They learn about and recognise equivalent fractions, simplifying them when necessary (for example, understanding that $^1/_3 = {}^2/_6 = {}^4/_{12}$). They move on to understand and show families of equivalent fractions. They build on earlier work, practising adding and subtracting fractions with the same denominator ($^2/_3 + {}^7/_9 = 1{}^1/_9$). Children also work with decimal equivalents of tenths and hundredths and of $^1/_2$, $^1/_4$, $^3/_4$, understanding that decimals and fractions are different ways of expressing numbers. They round numbers with one decimal place to the nearest whole number, and compare numbers with the same number of decimal places, up to two decimal places. They use fractions and decimals to solve straightforward money and measure problems.

Measurement

In Year 3, children learned to measure the perimeter of 2D shapes; they now extend this, calculating the perimeter of rectilinear shapes including squares. They work out the area of rectilinear shapes by counting. Children compare digital clocks and analogue clocks, reading, writing and converting time between the two systems. They begin using £ and p notation to record money.

Geometry: properties of shapes

Children learn about a wider range of geometric shapes, including different types of triangles and quadrilaterals. They develop work on acute and obtuse angles from Year 3, comparing and ordering angles up to two right angles. They work with lines of symmetry in 2D shapes.

Geometry: position and direction

Children begin to work with a coordinate grid (first quadrant only), using coordinates to describe positions on a grid.

Statistics

Children are introduced to the difference between discrete and continuous data, using bar charts for discrete data (numbers of children travelling to school by different methods) and line graphs for continuous data (children's heights). Children will build further on their work with line graphs in Year 5.

Year 4 Long Term Planning

Number and place value

- Using a variety of representations, including measures, children should become fluent in the order and place value of numbers beyond 1000, including counting in tens and hundreds, and maintaining fluency in other multiples through varied and frequent practice.
- They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far.
- They connect estimation and rounding numbers to the use of measuring instruments.
- Roman numerals should be put in their historical context so children understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time.

Addition and subtraction

- Children should continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency (see National Curriculum Appendix 1).

Multiplication and division

- Children should continue to practise recalling and using multiplication tables and related division facts to aid fluency.
- Children should practise mental methods and extend this to three-digit numbers to derive facts, for example 200 × 3 = 600 into 600 ÷ 3 = 200.
- Children should practise to become fluent in the formal written method of short multiplication for multiplying using multi-digit numbers, and short division with exact answers when dividing by a one-digit number (see Appendix 1).
- Children should write statements about the equality of expressions (e.g. use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations, e.g. 2 × 6 × 5 = 10 × 6.
- Children should solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the number of choices of a meal on a menu, or three cakes shared equally between 10 children.

Statistics

- Children should understand and use a greater range of scales in their representations and should begin to relate the graphical representation of data to recording change over time.

Geometry: position and direction

- Children should draw a pair of axes in one quadrant, with equal scales and integer labels. They should read, write and use pairs of coordinates (2, 5), including using coordinate-plotting ICT tools.

Fractions (including decimals)

- Children should connect hundredths to tenths and place value and decimal measure.
- Children should extend the use of the number line to connect fractions, numbers and measures.
- Children should understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths.
- Children should make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities. Children should use factors and multiples to recognise equivalent fractions and simplify where appropriate.
- Children should continue practice in adding and subtracting fractions with the same denominator, to become fluent through a variety of increasingly complex problems beyond one whole. Children should be taught throughout that decimals and fractions are different ways of expressing numbers and proportions.
- Children's understanding of the number system and decimal place value should be extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of whole number by 10 and later 100.
- Children should practise counting using simple fractions and decimal fractions, both forwards and backwards.
- Children should learn decimal notation and the language associated with it, including in the context of measurements. They should make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines.

Measurement

- Children should build on their understanding of place value and decimal notation to record measures, including money. They should use multiplication to convert from larger to smaller units.
- They should relate area to arrays and multiplication. Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit.

Geometry: properties of shapes

- Children should continue to classify shapes using geometrical properties, extending to classifying different triangles and quadrilaterals.
- Children should compare and order angles in preparation for using a protractor and compare lengths and angles to decide if a polygon is regular or irregular.
- Children should draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry; and recognise line symmetry in a variety of diagrams, including where the line of symmetry does not dissect the reflected shape.

Key Maths Concepts in Year 4

Introducing Roman numerals and the history of the number system

In Year 4, children will learn more about Roman numerals (which they first met in Year 3, in the context of analogue clock faces with Roman numerals).

By this stage, children will be familiar with the concept of place value, and the way that our number system allows us to represent any number using only the ten digits 0 to 9. Children will learn that most ancient civilisations (including the Greeks, Romans and Egyptians) used different number systems to ours, which is called the Hindu-Arabic number system.

In the Roman number system, letters were used to represent numbers, with I standing for units, V for fives, X for tens, C for hundreds and M for thousands. Because these letters were repeated to show quantity (such as, III represents 3, XXXVII represents 37 and CCCXXXIII represents 333) many numbers were represented by long and cumbersome chains of letters which are relatively hard to compare and use in written calculations. The Roman system did not include a concept of zero. Our understanding of zero within our current number system was originally developed in India. The Hindu word for zero is 'sunya'.

Children do not need to learn in detail about the different number systems that have prevailed in different times and places throughout history, but it is very helpful for them to get a sense that our current system is a relatively recent development. It's now used throughout the world, however, because of the efficient way it represents larger numbers and can enable us to record mathematical operations efficiently.

Understanding the difference between discrete and continuous data

In Year 3, children met a range of different formats for recording data, including bar charts. They now extend this to include line graphs, and they will need to begin to understand the different circumstances when it is appropriate to use line graphs rather than bar charts.

This involves understanding the difference between discrete data (which can be effectively recorded using bar charts) and continuous data (which is more effectively shown on line graphs).

As a rule of thumb, discrete data can be counted, whereas continuous data can be measured. So the number of spots on a ladybird would be discrete data (since ladybirds can only have a whole number of spots) and children could use a bar chart to record the number of spots observed on a group of ladybirds. The chart would clearly show that, for example, 7 ladybirds had five spots, 4 had two spots, 3 had three spots and none had four spots or one spot. Discrete data has units that cannot be split up.

Continuous data is data that can take any value within a range. So, for example, a person could be 152 cm, 152.1 cm, 152.17 cm and so on. Continuous data could be shown on a number line, and every point on the line would have meaning (whereas with discrete data, only certain points have meaning).

Continuous data is shown best on a line graph (or time graph) because it usually shows how a quantity changes over time. For example, children might use a time graph to record how a kitten's weight increased over time, or to record the height of a sunflower plant from seedling to full height