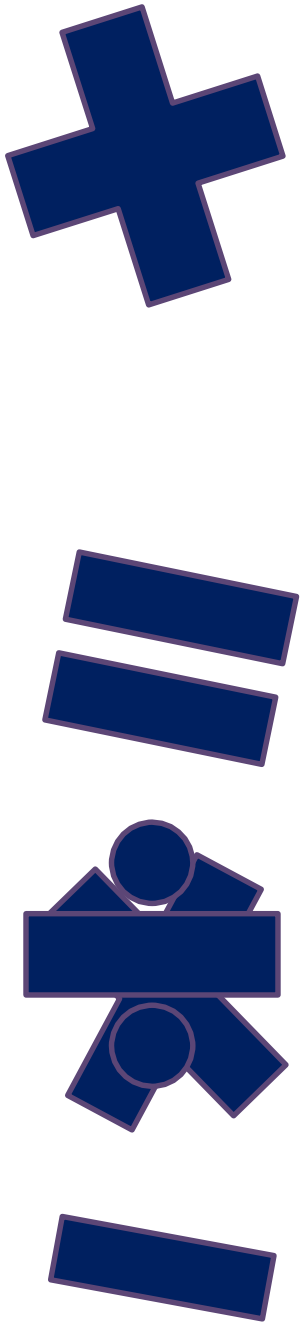
Year 3 Progression Long Term Plans Key Concepts

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.

Overview of Progression in Year 3

Number and place value

In Year 2, children learned about place value in two-digit numbers. In Year 3, they will extend their understanding to include the place value of three-digit numbers – for example, 232 is two hundreds, three tens and two ones. They learn to count in 4s, 8s, 50s and 100s, and work with numbers up to 1000. They begin to use estimation when dealing with number problems involving larger numbers.

Addition and subtraction

In Year 3, children practise mentally adding and subtracting combinations of numbers, including three- digit numbers. When using written methods for addition and subtraction, children learn to write the digits in columns, using their knowledge of place value to align the digits correctly. Children begin to use estimation to work out the rough answer to calculations in advance, and use inverse operations to check their final answers – for example, checking 312 + 43 = 355 by working out 355 – 43 = 312.

Multiplication and division

In Year 3, children learn the 3, 4 and 8 multiplication tables, and use their knowledge of doubling to explore links between the 2, 4 and 8 multiplication tables. They use facts from these new multiplication tables to solve multiplication and division problems. Building on their work with written mathematical statements in Year 2, they begin to develop more formal written methods of multiplication and division. They will extend this in Year 4 when they work with more complex multiplication and division problems.

Fractions

Building on work from Year 2, children learn about tenths, and confidently count up and down in tenths. They begin to make links between tenths and place value (ten units make a ten; ten tens make a hundred) and explore connections between tenths and decimal measures. Children extend their understanding of fractions to include more non-unit fractions (that is those with digits other than 1 as their numerator – for example, $^{1}/_{5}$ is a unit fraction, and $^{2}/_{5}$ is a non-unit fraction). They also begin to add and subtract fractions with the same denominator up to one whole, such as $^{3}/_{5} + {}^{3}/_{5} = {}^{4}/_{5}$, $^{4}/_{7} - {}^{2}/_{7} = {}^{2}/_{7}$.

Measurement

Children will learn to tell the time from analogue 24-hour clocks as well as 12-hour clocks. They will move on to use digital 24-hour clocks in Year 4. They will extend their work on money from Year 2, including working out correct change. They will also learn to measure the perimeter of 2D shapes and solve addition and subtraction problems involving length, mass and volume.

Geometry: properties of shapes

In Year 3, children begin to learn about angle as a property of shapes, and they connect the concept of angles with the idea of turning – for example, realising that two right angles equal a half-turn. They can identify whether a given angle is greater or less than a right angle (obtuse or acute). They can accurately describe lines as horizontal, vertical, perpendicular or parallel.

Statistics

In Year 2, children were introduced to pictograms, tally charts, block diagrams and tables, and this year they use these diagrams to answer an increasing range of questions, including two-step questions (in other words, those where there is a hidden question that needs to be answered before the main question can be tackled) For example, in order to work out *how many more cupcakes did Jon eat than Janie*, children first need to find out how many cakes each person ate.

Year 3 Long Term Planning

Number and place value

- Children should now be using multiples of 2, 3, 4, 5, 8, 50 and 100.
- Children should use larger numbers to at least 1000, applying partitioning related to place value using varied and increasingly complex problems, building on work in Year 2 (e.g. 146 = 100 and 40 and 6, 46 = 30 and 16).
- Using a variety of representations, including those related to measure, children should continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000

Multiplication and division

- Children should continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.
- Children should develop efficient mental methods, for example, using commutativity (e.g. 4 × 12 × 5 = 4 × 5 × 12 = 20 × 12 = 240) and multiplication and division facts (e.g. using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (30 × 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷ 3).
- Children should develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.
- Children should solve simple problems in contexts, deciding which of the four operations to use and why, including measuring and scaling contexts, and correspondence problems in which *m* objects are connected to *n* objects (e.g. 3 hats and 4 coats, how many different outfits; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

Measurement

- Children should continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (1 kg and 200g) and simple equivalents of mixed units (5m = 500cm).
- The comparison of measures should also include simple scaling and this should connect to multiplication.
- Children should continue to become fluent in recognising the value of coins, by adding and subtracting amounts, including mixed units, and giving change using manageable amounts. They should record £ and p separately. The decimal recording of money is introduced formally in Year 4.
- Children should use both analogue and digital 12- hour clocks and record their times. In this way they become fluent in and prepared for using digital 24- hour clocks in Year 4.

Addition and subtraction

- Children should practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Children should use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent (see National Curriculum Appendix 1).

Fractions

- Children should connect tenths to place value and decimal measures, not restricted to decimals between 0 and 1 inclusive and to division by 10.
- They should begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the [0, 1] interval, and ¼ + ¾ = 1 for example, relating this to measure.
- Children should understand the relation between unit fractions as operators and division by integers.
- They should continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, or unit fractions as a division of a quantity.
- Children should practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.

Geometry: properties of shapes

- Children's' knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygons and polyhedra. Children extend their use of the properties of shapes. They should be able to describe the properties of 2D and 3D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle.
- Children should draw and measure straight lines in centimetres.

Statistics

- Children should understand and use simple scales (e.g. 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy.
- They should continue to interpret data presented in many contexts.

Key Maths Concepts in Year 3

Adding and subtracting fractions with the same denominator within one whole

Children should begin to recognise fractions as numbers that can be used in calculations. Using practical apparatus and examples such as slices of a cake or parts of a sandwich, demonstrate how to add and subtract fractions with the same denominator. Begin with different ways of making one whole by using fractions that have the same denominator, such as a cake that is cut into 8 slices:

$1 = \frac{1}{8} + \frac{7}{8}$

$1 = \frac{2}{8} + \frac{6}{8}$

$1 = \frac{3}{8} + \frac{5}{8}$

$1 = \frac{4}{8} + \frac{4}{8}$

$1 = \frac{5}{8} + \frac{3}{8}$

$1 = \frac{6}{8} + \frac{2}{8}$

$1 = \frac{7}{8} + \frac{1}{8}$

Ask children to explain the pattern in the calculations in the answers. *What stays the same and what changes each time?* (The numerators change but the denominator stays the same.) Emphasise that we're recording how many eighths we have each time. Repeat for other fractions, such as sixths, fifths, tenths, and quarters.

In a similar way, discuss subtraction of fractions with the same denominator from one whole:

$1 = \frac{1}{8} + \frac{7}{8}$

$1 = \frac{2}{8} + \frac{6}{8}$

$1 = \frac{3}{8} + \frac{5}{8}$

$1 = \frac{4}{8} + \frac{4}{8}$

$1 = \frac{5}{8} + \frac{3}{8}$

$1 = \frac{6}{8} + \frac{2}{8}$

$1 = \frac{7}{8} + \frac{1}{8}$

$1 - \frac{8}{8} = 0$

Roman numerals from I to XII on clock faces

In Year 2, children will have had practice of telling the time to 5 minutes on analogue clock faces. When introducing Roman numerals on clock faces in Year 3, children can make the link between the number positions that they already know and the new symbols.

The Roman numerals for numbers 1 to 12 are:

1 = I

2 = II

3 = III

4 = IV (literally, 5 – 1)

5 = V

6 = VI (5 + 1)

7 = VII (5 + 2)

8 = VIII (5 + 3)

9 = IX (10 – 1)

10 = X

11 = XI (10 + 1)

12 = XII (10 + 2)

However, many clock faces use IIII for 4. Discuss with children why this might be.

Also, bear in mind that whereas 1, 2, 3 are usually shown upright all around a clock face, Roman numerals tend to be shown with their bases pointing towards the centre of the clock face. This can be confusing for children as the symbols can appear to be reversed. For example, 6 = VI, but is often shown upside down on a clock face as IΛ . You could demonstrate how the numbers radiate out from the centre of the clock face by turning the clock around to show the symbols right way up.