Year 2 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 Year 2 the pupils will use 'Inspire Maths' one of the DfE approved textbooks, which combines the Singapore pedagogy with leading UK expertise and is correlated to the new National Curriculum.

Overview of Progression in Year 2

Number and place value

In Year 2, children develop their understanding of place value from Year 1, learning the place value of each digit in a two-digit number; for example, 23 means two tens and three ones. They begin to understand the use of 0 as a place holder. They will build on this when they consider place value in three-digit numbers in Year 3. Children learn to count in 3s, which will help develop the concept of a third. They order numbers from 0 to 100 and use the <, > and = signs. They become more independent in partitioning numbers in different ways, and this helps to support their work in addition and subtraction.

Addition and subtraction

Children use mental methods to solve problems using addition and subtraction, as well as using objects and pictorial representations. They begin to record addition and subtraction in columns, reinforcing their knowledge of place value. They independently use addition and subtraction facts to 20, and this helps them derive number facts up to 100, such as seeing the parallels between 2 + 6 = 8 and 20 + 60 = 80. They add and subtract different combinations of numbers, including two two-digit numbers. They understand the inverse relationship between addition and subtraction (that one operation undoes the other), and use this to check their calculations.

Multiplication and division

In Year 2, children learn the 2, 5 and 10 multiplication tables, and use these facts in calculations. They recognise that multiplication and division have an inverse relationship, and begin to use the × and ÷ symbols. They learn that multiplication is commutative (2 × 10 is the same as 10 × 2) whereas division is not (10 ÷ 2 is not the same as 2 ÷ 10).

Fractions

Children extend their understanding of fractions to $^1/3$ and $^3/4$ and learn that $^1/2$ is equivalent to $^2/4$. They read and write the symbols $^1/2$, $^1/4$ for example. As well as experimenting practically with fractions and connecting unit fractions to the concepts of sharing and grouping, they begin to write simple fractions, such as $^1/4$ of 8 = 2. They will develop this in Year 3 when they learn about tenths and begin to find out more about non-unit fractions.

Measurement

Children learn to independently choose the appropriate standard units for a particular measurement and use a range of different measuring instruments. They recognise and use the £ and p symbols for money (but do not use mixed notation, such as £5.72), and undertake addition and subtraction using money. They learn to tell the time to 5 minutes, including quarter past and quarter to the hour.

Geometry: properties of shapes

By handling common 2D and 3D shapes (including quadrilaterals and cuboids, prisms, cones and polygons) children identify their properties, using the terms *sides, edges, vertices* and *faces*. They compare and sort shapes using their properties.

Geometry: position and direction

Children experiment with making patterns using shapes and begin to use the concept of right angles to describe quarter, half and three-quarter turns. They will develop this concept further in Year 3.

Statistics

Children are introduced to pictograms, tally charts, block diagrams and tables, using these to collate and compare information, and to ask and answer simple questions (for example, finding the number of items in a category, perhaps using one-to-many correspondence, or comparing different categories by quantity).

Year 2 Long Term Planning

Number and place value

- Using materials and a range of representations, children should practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They should count in multiples of three to support their later understanding of a third.
- As they become more confident with numbers up to 100, children should be introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations.
- Children should partition numbers in different ways to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand zero as a place holder.

Multiplication and division

- Children should use a variety of language to describe multiplication and division.
- Children should be introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.
- Children should work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, relating these to fractions and measures (e.g. 40 ÷ 2 = 20, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (e.g. 4 × 5 = 20 and 20 ÷ 5 = 4).

Measurement

- Children should use standard units of measurement with increasing accuracy, using their knowledge of the number system. They should use the appropriate language and record using standard abbreviations.
- They should become fluent in telling the time on analogue clocks and recording it.
- Children should also become fluent in counting and recognising coins. They should read and say amounts of money confidently and use the symbols £ and p accurately, recording pounds and pence separately.

Geometry: position and direction

- Children should work with patterns of shapes, including those in different orientations.
- Children should use the concept and language of angles to describe *turn* by applying rotations, including in practical contexts (e.g. children themselves moving in turns, giving instructions to other children to do so, and programming robots using instructions given in right angles).

Fractions

- Children should use additional fractions as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantity, a set of objects or shapes. They meet $^{3}/_{4}$ as the first example of a non-unit fraction.
- Children should count in fractions up to 10, starting from any number and using the $^{1}/_{2}$ and $^{2}/_{4}$ equivalence on the number line ($^{11}/_{4}$, $^{12}/_{4}$, (or $^{11}/_{2}$), $^{13}/_{4}$, 2). This reinforces the concept of fractions as numbers and that they can add up to more than one.

Addition and subtraction

- Children should extend their understanding of the language of addition and subtraction to include sum and difference.
- Children should practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10, 10 – 7 = 3 and 7 = 10 – 3 to calculate 30 + 70 = 100, 100 – 70 = 30 and 70 = 100 – 30. They should check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition.
- Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

Geometry: properties of shapes

- Children should handle and name a wider variety of common 2D and 3D shapes and identify the properties of each shape. Children identify, compare and sort shapes on the basis of their properties and use vocabulary precisely, such as sides, edges, vertices and faces.
- Children should read and write names for shapes that are appropriate for their word reading and spelling.
- Children should draw lines and shapes using a straight edge.

Statistics

- Children should record, interpret, collate, organise and compare information (e.g. using many-to-one correspondence with simple ratios 2, 5, 10).

Key Maths Concepts in Year 2

Commutative and non-commutative operations

Commutative operations are those where changing the order of the numbers in the calculation doesn't affect the answer (for example, 2 + 4 = 6, and 4 + 2 = 6). In Year 2, children meet the idea that some mathematical operations are commutative, whereas others are not. It's helpful to give children lots of examples so that they can begin to understand and make this connection for themselves, using objects and pictorial representations as well as written calculations.

Addition and multiplication are commutative:

- 6 + 5 = 11, and 5 + 6 = 11
- 4 × 3 = 12, and 3 × 4 = 12

Children can be encouraged to check that this is true for a wide range of multiplication and addition facts. Using concrete objects such as blocks is a good way to demonstrate that the outcome of addition is always the same, whether you start with for example with 6 blocks and add 5 blocks or vice versa. Similarly, for multiplication, make an array of 4 rows of 3 blocks and then walk around it to see that it is also 3 rows of 4 blocks.

Subtraction and division are non-commutative:

- 5 – 3 does not come to the same as 3 – 5
- 6 ÷ 2 does not come to the same as 2 ÷ 6

As children haven't met negative numbers yet, it isn't necessary to go into detail about the results which give answers in negative numbers – you could say *oh, we haven't got enough to take away five'* or *we'll have to cut the sweets up is we want to divide two sweets between six people*.

Inverse relationships

If two mathematical operations have an inverse relationship, this means that one operation 'undoes' the other (for example, 3 × 6 = 18 can be undone by performing the operation 18 ÷ 6 = 3). This is a concept which children first meet in Year 2, when the idea is introduced that there is an inverse relationship between addition and subtraction, and between multiplication and division.

Children should become familiar with the idea that, for example, you can check the answer to a statement like 2 × 10 = 20 by calculating 20 ÷ 2 = 10, or 20 ÷ 10 = 2. In the same way, you could check 2 + 10 = 12 by calculating 12 – 2 = 10 or 12 – 10 = 2. Plenty of practice is helpful in ensuring that children become fluent in using inverse relationships to check their calculations, and it helps to use concrete objects to demonstrate what is happening visually.

Linking division with fractions

In Year 1, children encountered the idea that division is related to the concept of grouping and sharing quantities (for example, 12 can be divided into 4 groups of 3, or 3 people can share 12 things by getting 4 things each). The idea of sharing can also be used to make a link between division and fractions – so 16 divided (or shared) by 2 is 8, and 8 is half of 16. Again, it will help to use concrete objects to demonstrate this, so children can see that dividing a number of objects by 2 is the same as splitting the group of objects into two halves.