Mathematics Curriculum

Reviewed: June 2019

Next review: June 2020

Scope of the Policy

The aims of Browney Academy reflect those of the 2014 National Curriculum for maths, which are that children:

- 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.

By the end of year 6, children are expected to be 'secondary ready'. To achieve this, children not only need to be fluent in their knowledge and recall of mathematical facts, but they also need to be competent and confident to be able to reason with and investigate concepts and also be able to apply them to solve problems. Therefore, once children become fluent in concepts at their year group/ stage in maths, they will then apply these concepts across the curriculum and use them for reasoning and solving problems. When they are able to do this, it is then that they are considered by the teacher to be fully secure in their knowledge and understanding at that stage.

The expectation is that the majority of children will move through the curriculum at broadly the same pace. However, decisions about when to progress should always be at the discretion of the teacher and based upon assessments regarding the security of pupils' understanding. Pupils who grasp concepts quickly should not be accelerated onto the next stage of maths curriculum content, but instead they should be challenged through rich and sophisticated problems in different contexts. Those who are not sufficiently fluent in earlier material should consolidate their understanding, including through intervention before moving on.

Maths in the Early Years

Opportunities are provided for children to learn and develop their key mathematical knowledge, skills and understanding through purposeful play and learning experiences, with a balance of adult-led and child-initiated activities.

Through play our children explore and develop learning experiences, which help them make sense of the world. They practise and build up ideas, and have the opportunity to think creatively alongside other children as well as on their own. They communicate with others as they investigate and solve problems.

The Foundation Stage has free flow between the inside and the outside learning areas which has a positive effect on the children's development. Being outdoors offers opportunities for children to explore and apply mathematical concepts in practical ways through construction and gardening for example.

Children are prepared for transition into Key Stage 1 with the introduction of some routine maths/ counting activities and a strong emphasis is placed upon the teaching of number and counting in preparation for the key stage 1 maths curriculum.

During the summer term, children are exposed to the concrete and pictoral approaches of the Singapore method (for example, the use of part-part-whole representations), in preparation for their transition in to Key Stage 1.

Maths in Key Stages 1 and 2

Browney Academy use the internationally acclaimed Maths No Problem programme to support the teaching of maths.

Maths No Problem is a detailed textbook scheme of work based upon the Singapore approach to teaching mathematics which ensures a deep understanding of mathematical concepts and understanding which underpins mastery. Maths No Problem uses a spiral progression to develop fluency, reasoning, problem solving and conceptual understanding of mathematics through a concrete - pictorial – abstract approach.

The textbooks are designed to support teaching through providing children with repetition and consolidation through variation and ensuring a seamless progression between concrete, pictorial and abstract models for maths.

Furthermore, children are encouraged to challenge themselves and explain their mathematical thinking through teacher questioning and problem solving activities.
Teachers enhance the Maths No Problem programme with their own knowledge and expertise to further challenge the more able and to support children with SEND. Same day intervention and feedback underpins the Singapore approach to ensure children progress and gaps in knowledge and understanding do not emerge or widen.

All maths lessons should follow a consistent lesson structure:

- Anchor Task (known as *In Focus)*- Children work in groups to explore a single problem, which allows children to demonstrate prior knowledge and to use their peers to extend their understanding

- Guided Practice- Main teacher input, in which discussion and modelling are actively used to grapple with activities in the textbook. This teacher-led session allows members of staff to develop understanding and support children who are struggling with their learning.

- Independent Practice – Children use their workbooks to demonstrate their understanding of the learning objective.

- Journaling – Children use their maths journals to use and apply their knowledge through problem solving activities. It is important that journaling activities offer chances for children to demonstrate mastery of a learning objective, rather than to use challenge as opportunities to move children onto work from succeeding year groups.

Use of Resources in Maths

Children of all ages and abilities should be encouraged to use resources to develop and explain their mathematical understanding. Some examples of resources used across the school include: Numicon, Base 10, and Counters. Such resources support with the concrete representations and understanding of concepts throughout all key stages.

Development into the pictorial representations across the school is achieved through Bar Modelling. This supports children with visualising concepts and problems at all ages and stages.

Finally, children should be encouraged to develop their abstract, written representations of mathematical concepts and the calculation policy should be followed to ensure consistency throughout all key stages.

Children in all stages should apply their knowledge and understanding of maths across the curriculum to solve problems.

ICT in Maths

Children at Browney Academy have access to a number of online maths resources such as Mathletics and Times Table Rock Stars. All such resources are used by pupils and teachers to strengthen fluency and enjoyment of maths.

Assessment

Children are assessed summatively at the end of each term against the National Curriculum expectations through Cornerstones tests which are in line with the end-of-year objectives of the 2014 National Curriculum.

Formative teacher assessments are ongoing throughout Key Stages 1 and 2 using assessment and moderation grids from Cornerstones. These allow teachers to record and evidence children's learning, in line with Developmental Skills statements for mathematics. Futhermore, data gleaned from this process allows the class teacher to monitor the progress of groups of children and individuals to inform planning and to set targets for children.

Marking and Feedback

Children receive daily marking and feedback. Children are provided with same day intervention to close gaps or to challenge the more able.

Marking should adhere to the school marking and feedback policy.

Parental Links

Parents are provided with documents to support the teaching of maths at Browney Academy. Key information regarding the teaching and learning of maths is available on the school website. Support materials for parents are also available on the school website. Children's teacher assessment results and targets are shared with parents at regular parent meetings.

British Values

The maths curriculum promotes the British Values of tolerance and resilience through problem solving and understanding of complex concepts. Children are required to persevere to solve problems. Teamwork is central to maths through peer assessment, mentoring and

group work. Mutual respect is developed as children work together and build confidence in one another. Children can feel safe to make mistakes and take risks in problem solving, thus developing self confidence and esteem. Children are encouraged to become life long learners alongside developing their mathematical skills across the curriculum through enterprising and problem solving.

Monitoring and Review

The subject is monitored in the termly by the subject leader. Monitoring involves lesson observations, planning and book scrutiny, pupil interviews and data analysis. A report is produced and submitted to the governors and headteacher. Staff are provided with both general feedback and individual feedback regarding the scrutiny.

Mathematics
Curriculum Content Overview
Summer 2019

Year 1	Autumn	Spring	Summer
	• Counting, counting objects and writing to 10 and 20 • Counting with 0 • Comparing objects and numbers • Ordering numbers • Comparing numbers • Making number bonds • Ways to add • Adding by counting on • Completing number sentences • Making addition stories • Solving picture problems • Ways to subtract • Subtracting using number bonds • Subtracting by counting back • Making subtraction stories • Solving picture problems • Positional language • Number patterns	• Adding to make 10 • Counting in 10s and 1s • Adding and subtracting 1s • Counting back • Subtracting from 10 • Addition and subtraction facts • Recognising solids, spheres, cubes, cuboids, pyramids • Recognising 2D shapes in everyday environment • Grouping shapes • Making patterns • Comparing height and length • Measuring length using things and a ruler • Measuring height and length using body parts • Counting to 40 • Writing numbers to 40 • Comparing numbers • Finding how much more • Making number patterns • Word problems • Making equal groups • Adding equal groups • Making equal rows • Making doubles • Solving word problems	• Grouping equally • Sharing equally • Making halves • Making groups • Counting to 100 • Finding 10s and 1s • Comparing numbers • Making number patterns • Telling time to the hour • Telling time to half hour • Using next, before, after • Estimating duration of time • Comparing time • Using a calendar • Recognising coins • Recognising notes • Comparing volume and capacity using more than, less than, full and empty • Find volume and capacity of a container using non-standard units • Describing volume using half and quarter • Compare mass using heavy, light heavier than, lighter than, as heavy as • Find mass of object using nonstandard units • Positions, movements, making turns

Year 2	Autumn	Spring	Summer
	• Count numbers up to 100 • Place value • Compare numbers • Number bonds • Number patterns • Single digit to 2 digit numbers • Simple addition of 10s and 1s • 2-digit numbers • Subtracting units from a 2-digit number • Multiplication as equal groups • Times tables • Multiplying by 2,5 and 10 • Grouping • Sharing • Dividing by 2, 5 and 10 • Using multiplication and division skills • Odd and even numbers • Measure length using standard unit of measure • Measuring in centimetres • Comparing in meters • Comparing in centimetres • Comparing length of lines	• Measuring mass in kilograms and grams • Comparing mass of 2 objects • Comparing mass of 3 objects • Use scales and balances to measure mass accurately • Reading temperature • Estimating temperature • Read and interpret a picture graph • Using the bar model • Writing amounts of money • Recognise value of notes • Recognise value of coins • Create equal amounts of money using different coins • To exchange denominations of money for different coins • Calculate change from £100 or less • Use bar model • 2D shapes • 3D shapes	• Halves • Quarters • Thirds • Use numerator and denominator • Recognise equivalent fractions • Compare and order • Count the number of wholes and parts to form mixed numbers • Tell and write time to 5 minute intervals • Sequence events of day • Draw hands on clock • Volume

Year 3	Autumn	Spring	Summer
	• Counting in 1s, 10s and 100s • Place value • Comparing and ordering numbers • Counting in 50s • Number patterns • Counting in 4s and 8s • Multiplying by 3, 4, 8 • Dividing by 3, 4 and 8 • Multiplying 2-digit numbers • Dividing 2-digit numbers	• Writing length in metres and centimetres • Kilometres • Comparing lengths • Reading weighing scales • Measuring in millilitres and litres • Naming, adding and subtracting • Measuring in seconds, minutes and hours • Changing minutes to seconds • Seconds to minutes • Picture graphs and bar graphs	• Counting in 10ths • Adding fractions • Subtracting fractions • Finding equivalent fractions • Finding the simplest fraction • Sharing • Making angles • Finding right-angles in shapes • Comparing angles • Making turns • Measuring total length around shape • Measuring perimeter • Calculating perimeter

Year 4	Autumn	Spring	Summer
	• Counting in 1s, 6s, 7s and 9s, 10s, 25s, 100s, 1000s • Using places value • Comparing and ordering numbers • Making number patterns • Rounding numbers • Rounding numbers to estimate • Finding sums • Adding with renaming and using mental strategies • Finding differences • Subtracting without renaming, with renaming and using mental strategies • Solving word problems • Multiplying by 0, 6, 7, 9, 11, 12 • Dividing by 1, 6, 7, 11 and 12 • Dividing with remainder • Solving word problems • Multiplying the same two numbers • Multiplying 3 numbers • Multiplying multiples of 10 • Multiplying 2-Digit numbers • Multiplying multiples of 100 • Multiplying 3-Digit numbers • Dividing 2-Digit numbers • Dividing 3-Digit numbers	• Drawing and reading picture, line and bar graphs • Counting in 100s • Writing and showing mixed numbers on a number line • Finding equivalent fractions • Simplifying mixed numbers and improper fractions • Adding and subtracting fractions • Solving word problems • Telling time on a 24-hour clock • Changing time in minutes to seconds and in hours to minutes • Solving problems on duration of time • Changing years to months and weeks to days • Writing 10ths • Writing 100ths • Writing decimals • Comparing and ordering decimals • Making number patterns • Rounding decimals • Writing fractions as decimals • Dividing whole numbers by 10 and 100 • Writing amounts of money • Comparing amounts of money • Rounding amounts of money • Solving problems involving money • Estimating amounts of money	• Measuring mass • Converting units of mass • Measuring volume • Converting units of volume • Measuring height • Converting units of length • Measuring perimeters in different units • Solving problems involving scale reading • Measuring the surface that an object covers • Measuring area • Knowing types of angles • Comparing angles • Classifying triangles • And quadrilaterals • Identifying symmetrical figures • Lines of Symmetry • Sorting shapes • Position and Movement • Writing 1 to 100

Year 5	Autumn	Spring	Summer
	• Reading and writing to 1 000 000 • Comparing to 1 000 000 • Making number patterns to 1 000 000 • Rounding numbers to 1 000 000 • Counting on to add • Counting on to subtract • Adding within 1 000 000 • Subtracting within 1 000 000 • Finding multiples • Finding factors • Finding prime numbers • Finding square and cube numbers • Multiplying by 10, 100 and 1000 • Multiplying 2-digit and 3-digit numbers by a single digit • Multiplying 4-digit numbers • Multiplying a 2-digit number by a 2-digit number • Multiplying a 3-digit number by a 2-digit number • Dividing by 10, 100, 1000 • Dividing 3-digit and 4-digit numbers • Dividing 4-digit numbers • Dividing with remainder • Word problems	• Reading tables • Reading line graphs • Dividing to make fractions • Writing improper fractions and mixed numbers • Finding equivalent fractions • Comparing and ordering fractions • Making number pairs • Adding fractions • Subtracting fractions • Multiplying fractions by whole numbers • Multiplying mixed numbers by whole numbers • Decimals • Percentages	• Knowing types of angles • Measuring angles • Investigating angles on a line • Investigating angles at a point • Drawing angles • Drawing lines and angles • Describing squares and rectangles • Investigating angles in squares and rectangles • Solving problems involving angles in rectangles • Investigating regular polygons • Naming and plotting points • Describing translations • Describing movements • Successive reflections • Measurements • Area and perimeter • Volume • Writing Roman numerals to 1 000 • Writing years

Year 6	Autumn	Spring	Summer
	• Reading and writing numbers to 10 000 000 • Comparing numbers to 10 000 000 • Comparing and ordering numbers to 10 000 000 • Rounding numbers • Using mixed operations • Multiplying by 2-digit numbers • Dividing by 2-digit numbers • Solving word problems • Finding common multiples • Finding prime numbers • Simplifying fractions • Comparing and ordering fractions • Adding and subtracting fractions • Multiplying fractions • Dividing a fraction by a whole number • Writing and reading decimals • Dividing whole numbers • Writing fractions as decimals • Multiplying decimals • Dividing decimals • Multiplying a decimal by a 2-digit whole number • Dividing a decimal by a 2-digit whole number • Dividing a decimal by a 2-digit whole number	• Measurements • Word problems • Finding the percentage of a number • Finding the percentage of a quantity • Finding percentage change • Using percentage to compare • Ratio • Describing a pattern • Writing algebraic expressions • Writing and evaluating algebraic expressions • Writing formulae • Using formulae • Solving equations	• Finding area and perimeter of rectangles, triangles, parallelograms • Finding the volume of cubes and cuboids • Investigating vertically opposite angles • Investigating angles in triangles and quadrilaterals • Solving problems involving angles in triangles and quadrilaterals • Naming parts of a circle • Solving problems involving angles in a circle • Drawing quadrilaterals • Drawing triangles • Drawing nets of 3D shapes • Showing negative numbers • Describing position • Drawing polygons on a coordinate grid • Describing translations, reflections and movements • Using algebra to describe position and movements • Understanding averages • Calculating the mean • Solving problems involving the mean • Showing information on graphs • Reading pie charts • Reading line graphs • Converting miles into kilometres • Adding, subtracting and using negative numbers