Bricknell Primary School

Mathematics Policy

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Subject Co-ordinators : Jamie Kitching

Maths

Curriculum Intent

At Bricknell Primary School, the teaching of maths has been carefully considered to enable our pupils to become fluent in the fundamentals of mathematics, through varied and frequent practice and with the challenge of increasingly complex problems over time. Developing mathematical reasoning skills, children follow lines of enquiry, conjecturing relationships and generalisations and develop arguments and justification based on their mathematical knowledge.

At Bricknell Primary School, our maths curriculum is built alongside White Rose. This sequence has been refined by our highly skilled subject leaders in order to meet the needs of every child at the school. Objectives for each year group are progressively mapped out to ensure our pupils are given the acquired skills and knowledge to further enhance their education journey into mathematics at KS3. Maths in EYFS is taught daily using Power Maths. This curriculum mastery program was designed by White Rose to spark curiosity and excitement. It is built around a child centred lesson design that models and embeds a growth mindset to allow for a deeper understanding of maths.

Our aim is to provide inclusive and aspirational environments and learning experiences where pupils thrive and build the cultural capital they need to make aspirational choices about their own futures, overcoming any barriers. In order to achieve this, our curriculum is underpinned by the principles highlighted in our Aspiration Curriculum.

Within the maths Progressive Skills Document, our progressive objectives identify what pupils should know by the end of each year group and link to their prior learning. These enable teachers to identify and plug gaps in pupils' knowledge and skills. Within maths, pupils will develop a deep understanding of Key Concepts and Second Order Concepts. These key concepts have been carefully considered and identified as the core knowledge and skills required to successfully achieve in maths. The key concepts are revisited and developed as the pupils move through the school to ensure their knowledge and skills are firmly embedded within their long term memory. These key concepts compliment work carried out across the school in line with the Aspiration Curriculum. The expectation is that, by the end of primary school, children will know and understand these key concepts which will give them a solid foundation to enter the maths curriculum at KS3.

In addition to first order key concepts, the subject leaders have identified subject specific second order concepts. These can be used across all aspects of a subject to organise the substantive knowledge and skills taught.

Key Concepts :

- Number and Place Value
- Addition and Subtraction
- Multiplication and Division
- Fractions, Decimals and Percentages
- Geometry
- Statistics
- Shape
- Measures
- Ratio

Second Order Concepts : These can be used across all aspects of a subject to organise the substantiative knowledge taught.

- Arithmetic Skills
- Fluency
- Application
- Reasoning and Problem Solving

By the end of Nursery, children will :

Have a deep understanding of numbers up to 5 being able to develop their skill of subitising up to 5 as well as matching numerals, accurately touch counting, verbally using the part whole model, reciting numbers and being introduced to the correct terminology of the numerical system. Children will be confident in recognising 2D and 3D shapes as well as briefly describing their properties. Children will be able to identify and describe patterns, continue to make and copy patterns then spotting errors whilst using the concept of repetition. Furthermore, children can learn how to sort objects and numbers into groups as well as comparing against size, height, length and colour. Finally, children will describe a sequence of events using their day as a prompt.

By the end of EYFS, children will:

Have a secure understanding of Number and Numerical Patterns across the new EYFS Framework. Children will have a deep understanding of numbers to 10, being able to develop their skill of subitising up to 5 as well as automatically recalling number bonds up to 5 and even 10. Furthermore, children will be able to

verbally count beyond 20, recognising the counting system, comparing quantities up to 10 in various contexts and exploring and representing numbers within 10, including odds, evens and doubles. The EYFS children will use every day language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects in order to help them solve problems. They will recognise, create and describe patterns, exploring characteristics of everyday objects and shapes, using their mathematical language to describe them.

By the end of Key Stage 1, children will :

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, e.g. concrete objects and measuring tools. Pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. They should also use 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 their 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.

By the end of Lower Key Stage 2, children will :

Become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. They will develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. Pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Pupils will have the opportunity to 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 instant recall of 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.

By the end of Upper Key Stage 2, children will :

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. 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. Pupils will classify shapes with increasingly complex geometric properties and that they learn the required vocabulary they need to describe them. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

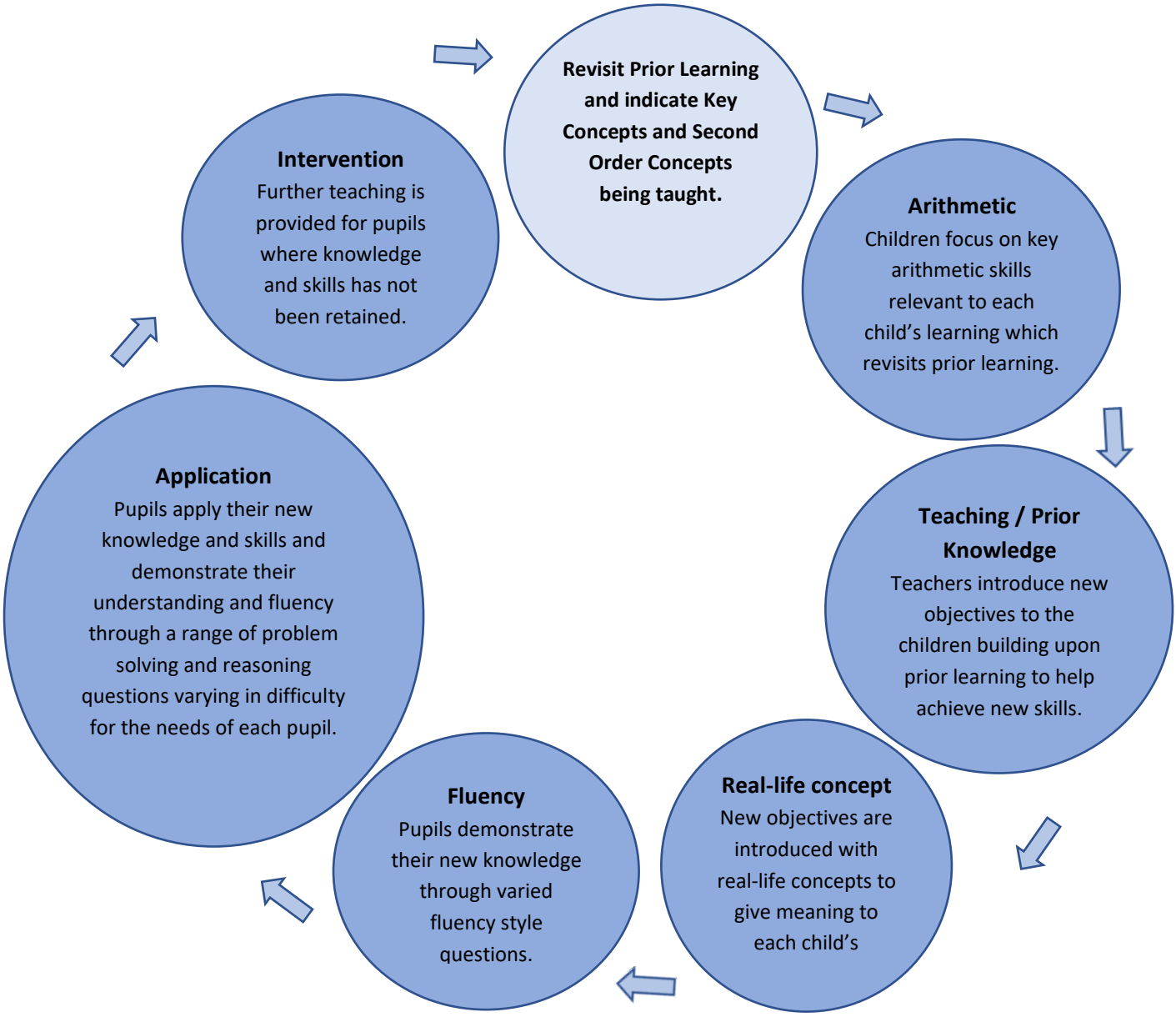
Any child working below their age related expectation will receive a tailored curriculum with personalised objectives taken from the Curriculum Assessment Toolkit, (CATs). This will enable all children to build upon the skills and knowledge needed to bridge the gap between themselves and their peers enabling them to reach their full potential.

Implementation

At Bricknell Primary School, our curriculum is carefully mapped out into a Long Term Plan. This enables links between subjects to be identified and carefully planned for to support pupils' retention of knowledge and skills.

The academic year is broken down into strands of work which form the key concepts. Each strand and unit builds upon prior learning, within the current year group and from previous year groups.

At Bricknell, all maths lessons will follow the same teaching sequence outlined below.



All pupils take part in a daily maths lesson following the teaching sequence outlined above. All children will be exposed to a fluency based activity, set at age related expectations. If children are unable to access this task, they will complete a pre fluency activity first ensuring the knowledge, skills and understanding needed to achieve the fluency task is worked towards. Children are then exposed to a wide range of fluency style questions. From here, pupils then progress on to applying their acquired skills within reasoning and problem solving style questions which increase in complexity. Tackling progressively difficult problems, which draw upon learning and skills from many mathematical areas, children display confidence and efficiency in their work. In line with the marking policy, at the end of each lesson, teachers will assess each child's next steps: further challenge could be provided while high quality interventions can be planned and delivered where needed in the next lesson to address misconceptions and progress children's learning. Questions are carefully chosen based on what the children have been exposed to over the course of their topic. Not all pupils will complete all of the activities during a sequence of learning but it is important that all pupils are given the opportunity to access the fluency and application stages at an age related expectation, unless there is a significant SEND issue that prevents them from doing so. Children working below age related expectations have a personalised curriculum following the Curriculum Progression Toolkit (CPT). These objectives are tailored to meet their individual needs but ensure they follow the same sequence of learning and topics as their year group.

To further enhance the children's rapid recall of number facts, KS2 children access Times Table Rock Stars (TTRS) which give the pupils unlimited opportunities online to apply their knowledge of all tables up to 12 – this forms a part of the school's 'Bricknell Standard'. To meet this standard, Year 3 and 4 pupils complete 25 minutes of TTRS a week; Year 5 and 6 pupils complete 30 minutes per week. Children can practice their times table facts, enjoy playing games and battling against their peers and teachers. In KS1, the children focus on their rapid recall of number facts and times tables. When staff believe the children are ready, they are then able to access the Times Table Rock Stars programme to embed their times tables further.

Finally, teachers will seek to take advantage of opportunities to make cross curricular links. Staff will plan for pupils to practice and apply their skills, knowledge and understanding acquired through maths lessons in other areas of the curriculum.

As a result of Covid-19 and its impact upon the curriculum, the subject leads have adapted the maths provision across each year group. Once the children returned to school during Spring Term 2021, the maths curriculum was tailored to meet the needs of each child in preparation for their upcoming change of year group. While a long term plan is in place for the subject, teachers, with knowledge of their own class' learning, have the flexibility to cover each objective and topic at the pace which is required of their children. As the maths curriculum at Bricknell Primary School is based upon progressive skills, it is vital that objectives are embedded before children move on. Allowing teachers the flexibility on the length of time dedicated to each objective will result in some classes being unable to fulfil all areas of the long term plan. Therefore, the subject leads have identified closely linked objectives between year groups which can be delivered together in the child's next year group. Furthermore, other objectives have been identified which can be taught in a cross curricular manner.

Maths transition from Nursery to EYFS to KS1

In order to help pupils receive a smooth transition from EYFS to KS1 in maths, we implement a number of plans.

In order for smooth transition from Nursery to EYFS, we have devised a long term plan for Nursery which flows into the EYFS maths long term plan. At the same time, on the same week, Nursery will be teaching the same Power Maths teaching concept as EYFS with guidance from the 3/4 Development Matters document. For example, while sharing is being taught in EYFS, Nursery will hold a teddy bears picnic with a mathematical emphasis on sharing.

As EYFS follow Power maths and NCTEM, and KS1 follow the national curriculum alongside White Rose, a transition meeting is held with parents to discuss the change of scheme and how this looks for their child.

Upon transition, KS1 staff identify the children who have not reached their Early Learning Goals and provide extra support for their transition with maths. This is evident with a '4th class' which contains a lower pupil to staff ratio. As Year 1 work practically with regularity, the children in the 4th class integrate back to their usual class in these lessons and worked in mixed ability groups to ensure they receive both peer and staff support to aid their development.

Impact

A wide range of strategies are used to measure the impact of the maths curriculum.

Assessment forms an integral part of the teaching and learning of this subject. The formative assessment of maths is essential when identifying the strengths of individual children and their next steps. If pupils have misconceptions or gaps in their subject knowledge, additional teaching and support is provided in lesson or the following day. Summative judgements of maths are made each term with these being moderated to quality assure decisions. The progress of individual pupils are carefully monitored on a termly basis and those identified as not making progress are given high quality intervention. All children from Years 2 – 6 complete termly assessments. The data generated from these assessments are then analysed and actions put in place to move children forwards, ready for the next term. Fortnightly, Year 3 – 6 complete a small arithmetic paper. Teachers complete a QLA based on these papers to inform their 'Fast Maths' sessions which begin maths lessons. On the alternate week, times tables tests are completed with the same process.

Our subject leader will also monitor the effectiveness of the maths curriculum through carrying out regular subject 360 evaluations. These evaluations are quality assured by the Senior Leadership Team and Governors.

The effectiveness of maths is also monitored through pupil and parental voice throughout the course of the year.

As a result of the maths curriculum at Bricknell Primary School, pupils leave their primary school journey with a solid knowledge of mathematics in preparation for their transition to secondary school. This is supported with the consistently excellent KS2 SATs results. For the last academic year (2023/24) 94% of children achieved age related expectations and 34% greater depth.

Cross Curricular Connections

Teachers will continuously seek to take advantage of opportunities to make cross curricular links across the curriculum. They will plan for pupils to practise and apply the skills, knowledge and understanding acquired through mathematics lessons in other areas of the curriculum. For example, measuring and scaling in Design and Technology, using grid references in Geography, using a timeline in History and coding in Computing.

Equality

Children should not be discriminated against in terms of gender, race, religion or disability. All children should have the opportunity to participate fully in classroom and outdoor maths lessons and activities and reasonable adjustments will be made to ensure this. A range of activities will be easily accessible for children to enable all, from the least to the most able, to independently develop and embed their core mathematical, fluency and application skills.

Class teachers and phase leaders have a duty of care to ensure that any children who are not making progress or attaining their age related expectation receive extra support to allow them to meet their full learning potential. Intervention sessions are tailored to meet the needs of individual pupils or small groups. High quality interventions can be aimed at pupils who need misconceptions and gaps in their learning addressing, those not making sufficient progress, working alongside vulnerable pupils and more able groups and as a pre teaching opportunity. Interventions are mainly teacher led in maths with some sessions being delivered by support staff but are overseen, directed and quality assured by the class teachers. Intervention sessions are easily identified in children's maths books by being completed on light blue paper or beside blue post-it notes.

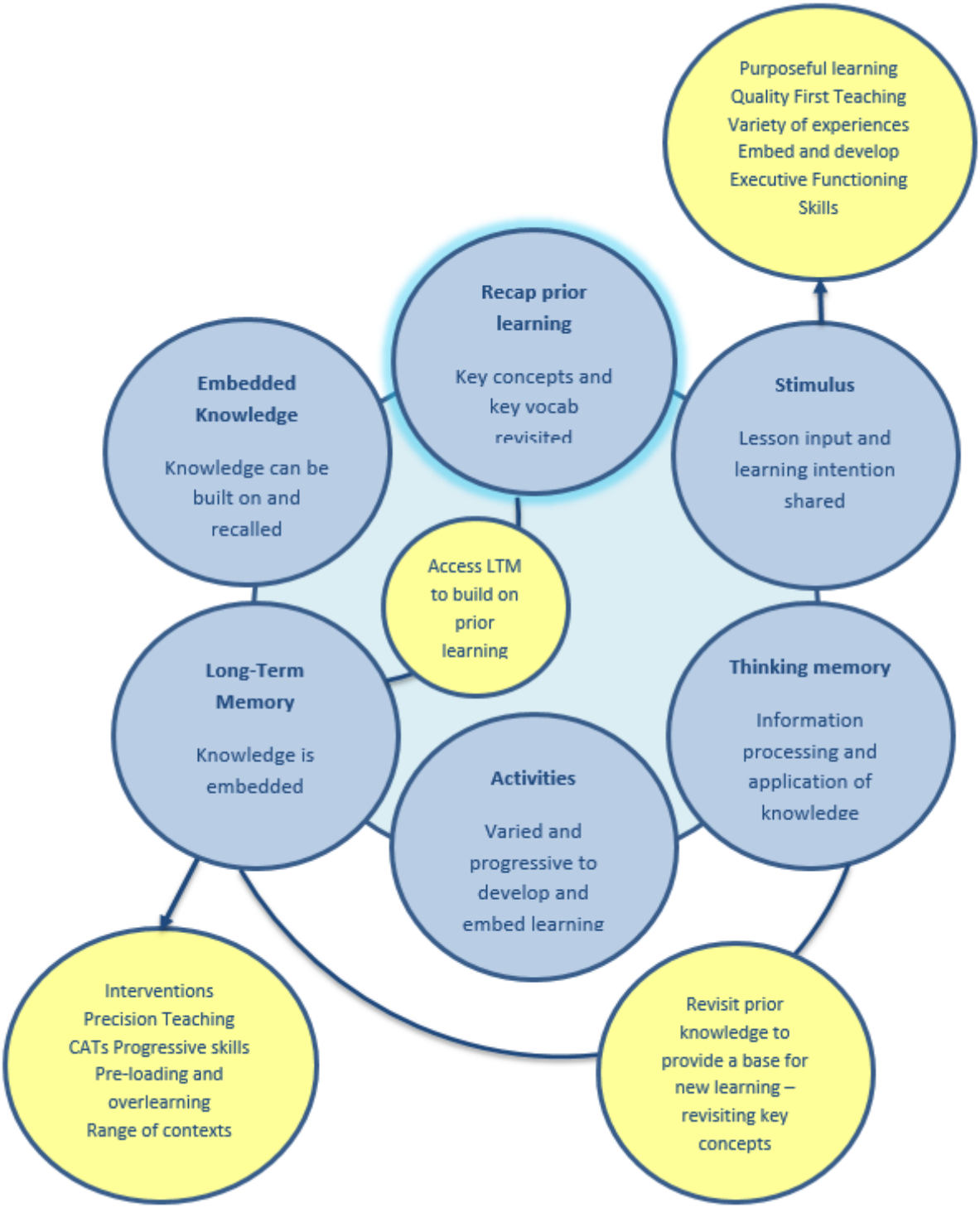
SEND

At Bricknell Primary School, we have a high SEND population and our pupils are fully immersed into the broad and balanced curriculum. However, we tailor the curriculum to meet the individual needs of SEND pupils. Where a child's need prevents them from accessing the age related expectations for subjects, planning is tailored to meet the individual needs of all pupils using the Curriculum Progression Toolkit, (CPT), document. This document breaks down each objective across the curriculum to enable all pupils to achieve success at an appropriate level for their needs.

Metacognition

Metacognition relates to thinking about thinking. It is a mechanism to enhance student learning, both for immediate outcomes and for helping students to understand their own learning processes. Metacognitive strategies are embedded into all areas of our curriculum and opportunities are planned to develop these skills over time. These skills include self-questioning, meditation, reflection, developing an awareness of strengths and weaknesses and an awareness of personal learning styles. Developing this metacognitive understanding is a skill for life. When learners "think about their thinking" they are more capable of independent self-improvement. At Bricknell, metacognitive strategies are learned, practiced and made into habits in order to improve learning, self-understanding and thinking skills, impacting both the present and future.

Our metacognition and working memory model is shown below:



All staff have had extensive CPD, in collaboration with the Educational Psychologist, to support their understanding of child development and metacognition strategies to enable them to develop the knowledge and skills required to enable children to learn progressively over time.

Evaluation

In evaluating the effectiveness of our mathematical teaching, maths is monitored in a number of ways to ensure that teaching styles, resources and the curriculum meets the needs of all pupils including,

- Informal lesson observations through drop in sessions
- Informal evidence trail drop in sessions
- Work and planning sampling
- Pupil and staff voice
- Learning walks
- Data analysis
- Moderation of teacher assessment judgements using the available evidence base, (internal and external). As a result of moderation, any issues identified are fed back to teachers and support is put in place. Ways forwards are then revisited after an agreed time frame
- Quality assurance of intervention and evaluations of their deliverance and progress

The mathematics team work together to focus on and evaluate different aspects of maths. The focus is to ensure that all practice in mathematics, across the school, is current, relevant and meets the needs of all learners.

The mathematics team will undertake a range of work scrutinies across the academic year looking at different aspects of mathematics. Moderation of assessment judgements takes place to ensure accurate and consistent data across the school as well as standardisation exercises to match assessment judgements which are compared against national expectations.

The mathematics team will produce regular guidance to staff to aid the teaching of mathematics and will provide CPD as identified by national and local issues as well as through ongoing school self-evaluation.

Reports are made to the Governing Body on progress and standards in mathematics across the school. Dedicated time at the Curriculum and Standards Committee meetings allow the Governors time to develop their knowledge of mathematics at Bricknell and to ask questions and challenge the SLT. Reports are written giving a breakdown of strengths, ways forwards and data analysis to discuss with members of the Governing Body.

The Governor with responsibility for mathematics meets each term with the mathematics team to discuss key issues and progress against the School Improvement Plan priorities.

Resources

All year groups have access to a range of resources which compliment their topics. For example, place value counters, multiplication squares, Base 10, clocks, metre sticks, trundle wheels, place value cards, fraction blocks, shapes, etc. The mathematics team regularly complete an audit of resources, updating them accordingly so they enhance and compliment the staff's lessons. The Progressive Skills Document has objectives for each year group which are progressive, building upon the children's prior learning and preparing them for new learning. Knowledge Organisers are available for all children illustrating children's prior learning from their previous year groups, outlining the core mathematical skills children will need to revisit and newly learn.