

Bricknell Primary School



Mathematics Policy



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Subject Co-ordinators : Jamie Kitching and Hannah Schofield



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 follows the sequence of 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. The subject leaders have then carefully worked to create a Progressive Skills Document where 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.

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 and 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

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

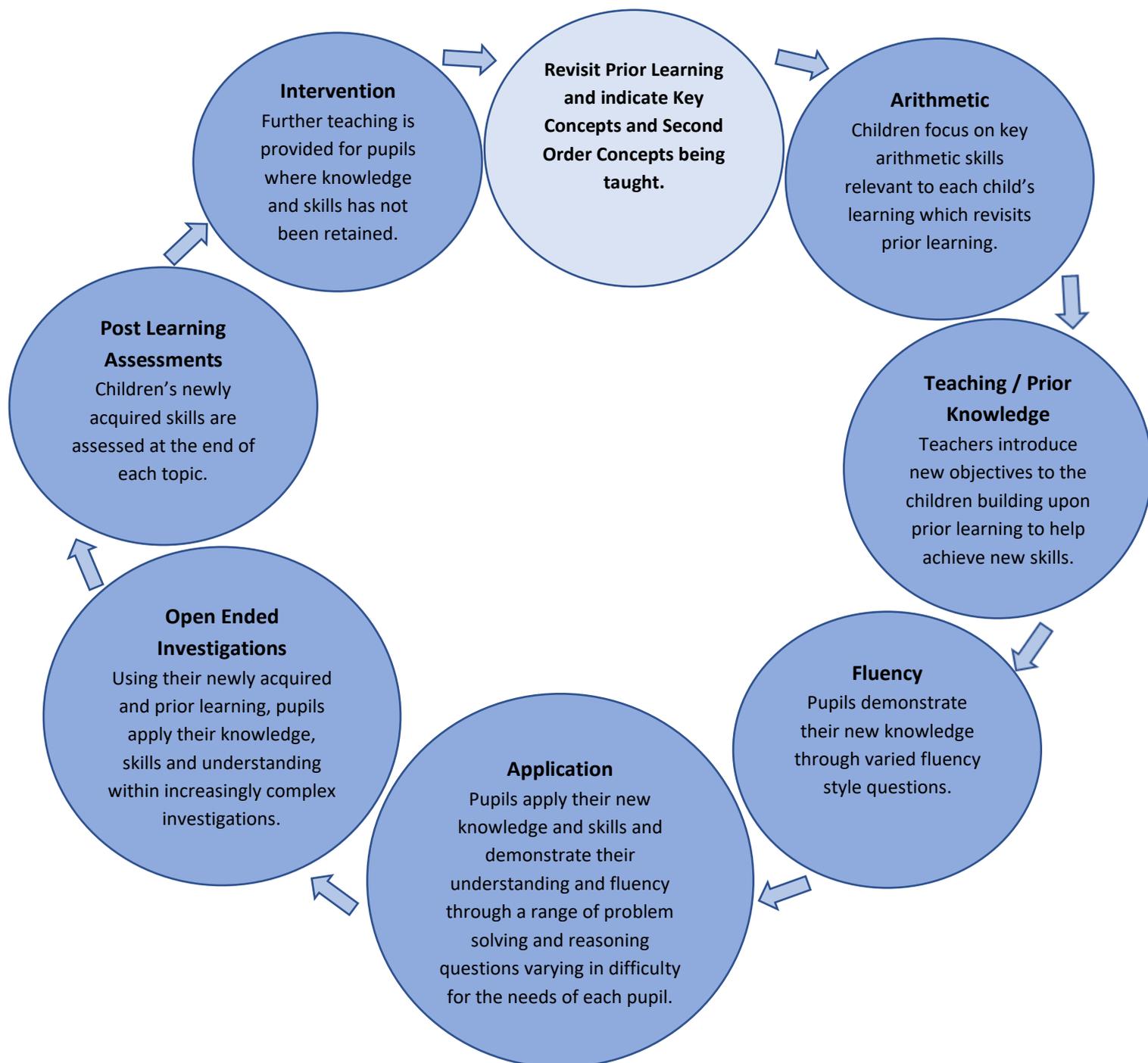
Any child working below their age related expectation will receive a tailored curriculum with personalised objectives taken from the Curriculum Assessment Toolkit, (CATs). This will enable all children to build upon the skills and knowledge needed to bridge the gap between themselves and their peers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

Implementation.

At Bricknell Primary School, our curriculum is carefully mapped out into a Long Term Plan by our highly skilled subject leads. 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.



In light of Covid-19 and Bricknell's Recovery Curriculum, subject leaders have identified key concepts across the curriculum which need to be prioritised in each year group to ensure that pupils have the knowledge required to access their next progressive steps in their education and enable them to access the National Curriculum.

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 within a range of everyday contexts. From here, pupils then progress on to applying their acquired skills within reasoning and problem solving style questions, ending their sequence with an increasingly complex investigation. Tackling progressively difficult problems, which draw upon learning and skills from many mathematical areas, children display confidence and efficiency in their work. All children will complete a Post Learning Assessment written by the White Rose Maths Hub. Questions are carefully chosen based on what the children have been exposed to over the course of their topic. They are accessible to all children, especially those who are visual learners. If errors have been made across the sequence of learning, high quality intervention is put in place to address these misconceptions made in order to move learning onwards. 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 Assessment Toolkit, (CATs). These objectives are tailored to meet their individual needs but ensure they follow the same sequence of learning and topics as their year group.

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 centered lesson design that models and embeds a growth mindset to allow for a deeper understanding of maths.

In addition to the dedicated maths hour, mental arithmetic practice is organised to occur 3 times a week during afternoons. Pupils will practice key arithmetic skills which are relevant to each child's year group and their learning which they have either revisited or newly acquired.

To further enhance the children's rapid recall of number facts, the children access Times Table Rock Stars which give the pupils unlimited opportunities online to apply their knowledge of all tables up to 12. As well as accessing the programme online, children are able to complete paper versions within their classroom, 3 times a week, (KS2). For children in KS2, a Times Table Rock Stars club is offered every playtime where 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 completing a weekly assessment. 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.

All children in EYFS and KS1 complete an additional, daily 15 minute maths less each afternoon endorsed by the NCETM. This programme further enhances and embeds the children's core mathematical skills using a variety of concepts within everyday contexts and use of manipulatives.

In the Autumn term, an information evening is held for the parents and carers of all new EYFS children. They are provided with an overview of maths in the reception year and given suggestions of further ideas for developing mathematical knowledge and understanding in a fun and practical way at home. Maths information evenings for the parents of the pupils throughout the whole school are also planned when appropriate.

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 over the past 2 years, 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.

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. Post Learning assessments, created by the White Rose Maths Hub, are completed at the end of each topic to identify the progress pupils have made. Judgements are then triangulated against end of topic assessments, evidence in books and the Key Performance Indicators for each year group. The assessments give a clear learning journey of all pupils. If pupils have misconceptions or gaps in their subject knowledge, additional teaching and support is immediately provided. 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. The formative assessments consist of White Rose Maths Hub papers for the Autumn and Spring terms then Optional SATs through TestBase for the Summer term. Pupils in Years 2 and 6 complete their Standard Assessment Tests, (SATs) during the Summer term.

Our subject leaders 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.

Extra-Curricular.

In the Autumn term, an information evening is held for the parents and carers of all new reception children. They are provided with an overview of maths in the reception year and given suggestions of further ideas for developing mathematical knowledge and understanding in a fun and practical way at home. Maths information evenings for the parents of the pupils throughout the whole school are also planned when appropriate. The school is involved in the NCETM Mastery Mathematics programme. A representative from the NCETM works alongside the maths subject leads visiting the school on a half termly basis, completing an action plan for the school, conducting learning walks, work sampling and CPD workshops. Children and staff in EYFS and KS1 take part in the NCETM Mastering Number Programme. An additional daily 15 minute maths lesson, on top of the dedicated maths hour, is undertaken each afternoon by these pupils to enhance and embed their core mathematical skills further using a variety of every day concepts and use of manipulatives. For children in KS2, a Times Table Rock Stars club is offered every playtime where children can practice their times table facts and enjoy playing games and battling against their peers and teachers.

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, scaling, weighing and cooking 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.

SEND.

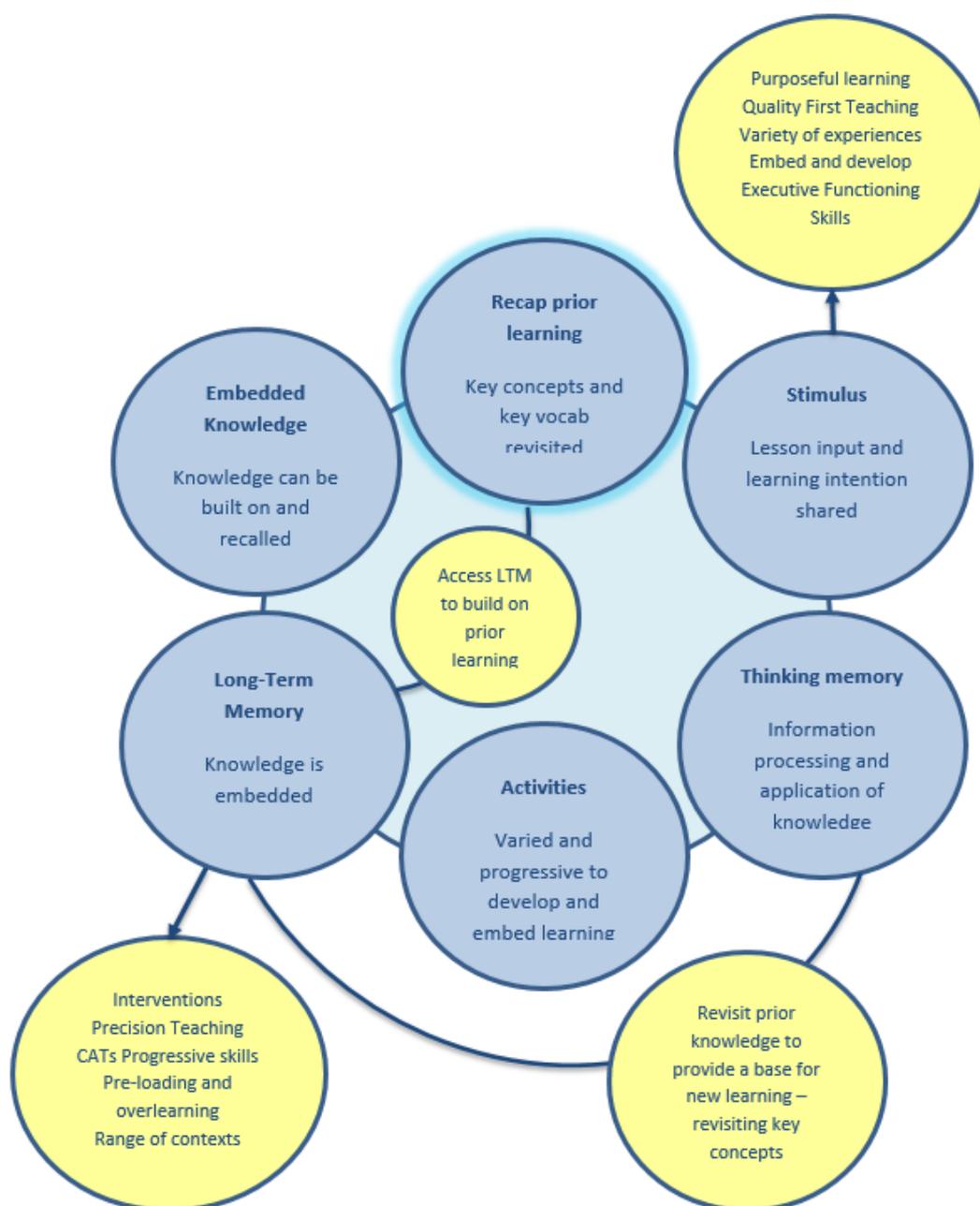
At Bricknell Primary School, we have a high SEND population and our pupils are fully immersed into the broad and balanced curriculum. However, we tailor the curriculum to meet the individual needs of SEND pupils. Where a child's need prevents them from accessing the age related expectations for subjects, planning is tailored to meet the individual needs of all pupils using the Curriculum

Assessment Toolkit, (CATs), document. This document breaks down each objective across the curriculum to enable all pupils to achieve success at an appropriate level for their needs. This ranges from P4 to Year 6 to ensure that there is no ceiling on any child's learning. In addition to this, some pupils are given the opportunity to take part in an AQA life skills programme. This programme consists of a sequence of skills that children work towards and develop their independence. This programme has been developed by the external agency IPASS and is tailored to meet the individual needs of our pupils. Each skill, when mastered, is rewarded with a qualification and certificate. Prior to the children starting this at the age of seven, pupils take part in the CATs PSHE scheme of work which was developed alongside a local special school. This programme aims to plug gaps and remove barriers to learning.

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 interviews 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,
- Analysis of Key Performance Indicators, and,
- Use of Post Learning Assessments to judge a child's progress at the end of each topic.

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 scrutinises 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.

Termly 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. Termly 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.

To summarise the effectiveness of the subject, we should be aware of the following ;

- Do we ensure the teaching of maths gives children an understanding of their basic, core mathematical skills and how they relate to the real world we live in?
- Do we provide pupils with a growing mathematical vocabulary?

- Do we provide opportunities for independent and open ended investigations in maths?
- Do we make use of ICT to develop pupils' understanding and application skills?
- Do we create a learning environment which allows pupils to influence and direct their learning journey through the mastery approach?
- Do we ensure that children are able to work collaboratively?
- Do we ensure core mathematical skills are revisited, enhanced and embedded?
- Do we ensure pupils are able to develop their preferred learning style by being exposed to a range of high quality, relevant manipulatives?

Resources.

All year groups have access to a range of high quality, relevant resources which compliment their topics. For example, place value counters, multiplication squares, numicon, 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 during their new year group within Number and Place Value, Addition and Subtraction and Multiplication and Division.

Staff CPD.

At Bricknell Primary School, invest heavily in CPD to ensure all staff feel empowered to deliver lessons, across all curriculum subjects, and have the ability to embed and assess the metacognition strengths of all pupils.