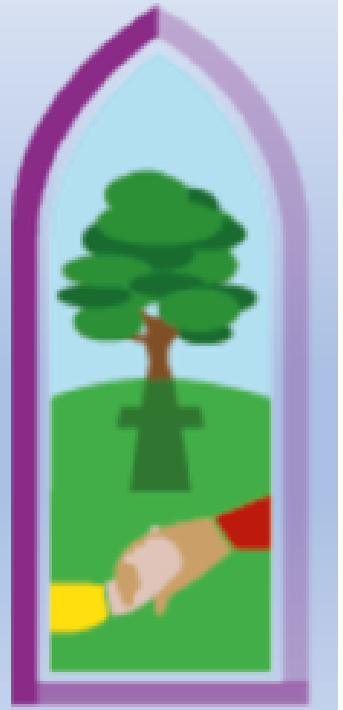
Mathematics INTENT



Through small, carefully planned steps in learning we will:

- Develop children's conceptual, procedural knowledge and build their conditional strategies.
- Develop children's mathematical language by speaking and listening in the classroom.
- Simultaneously, nurture the development of children's disciplinary concepts.

We aim for children to master their mathematics learning through our vehicle of White Rose Maths (WRM).
Our curriculum aims to foster the fluent recall of facts and procedures and apply these to vital problem-solving tools.

To this end, we carefully sequence core declarative, procedural and conditional knowledge. We understand that children need to be proficient in declarative and procedural knowledge in order to problem solve so that their working memory is not overloaded.

Conditional Strategies –
Relationship between information, strategies and missing information.

"I know when…"

Declarative –
Relationship between facts.

"I know that…"

Procedural methods –
Relationship between facts procedures and missing facts.

"I know how…"

Using WRM, declarative and procedural knowledge are taught together in order to reflect the strong link between them. Children need familiarity with both the facts and the method. Our Beechcroft mathematics curriculum is National Curriculum compliant and **focuses on depth over breadth.**

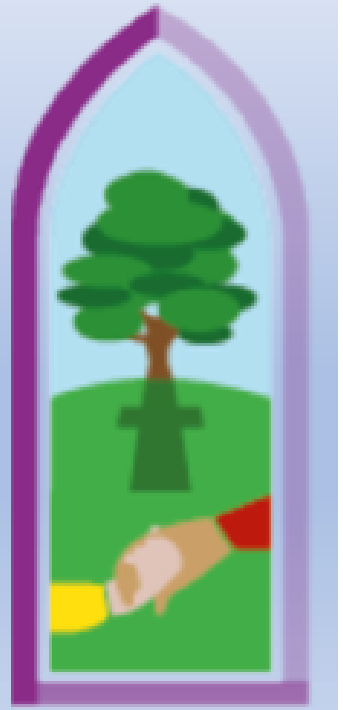
Mathematics INTENT

In our maths teaching, we focus upon bringing together careful sequencing and alignment of content through explicit modeling (My Turn), guided practice (Our Turn) and independent practice (Your Turn) with ongoing assessment between these stages.

We aim for all our children to develop positive attitudes to mathematics by building upon previous successful learning. This proficiency approach helps prevent children from developing anxiety for mathematical learning. Our core **curriculum details the facts, concepts and strategies that give children the best chance of developing proficiency.**

Declarative knowledge is important from an early age to prevent cognitive overload. For example, not knowing number bonds will mean that children struggle with future calculations and their working memory will become overloaded. **Therefore, one of our curriculum priorities is the promotion of and recall of core declarative knowledge**.
We prioritise the use of manipulatives as a bridge to the formal methods of calculation e.g. from Numicon to number bonds.

Our **calculation policy** signposts simple tools which offer no distractions. It illustrates the key manipulatives we use to build declarative knowledge through a series of simple visual approaches and tools. We explicitly teach formal and diagrammatic methods to reduce the likelihood of learner generated errors. We also impress upon children the formal layout of calculations and solving problems. We recognise that informal methods are a bridge to learning and rehearsing formal methods, leading to sound procedural knowledge e.g. bar modeling is taught to bridge between arithmetic and algebra.



Proficient **problem solvers** have facts and methods at their disposal. With these in place, children are less likely to be distracted by surface features of any problem, as they will have the space to build their conditional knowledge. Therefore we recoginise that children need to know:

- Useful combinations of facts and methods within a topic.
- Be taught recognition of problem types.

Content	Type 1	Type 2
Declarative	Fact retrieval	Explaining relationships between the facts
Procedural	Method rehearsal	Explaining principles, proving conceptual understanding (e.g. use of informal methods, creating bar models and interpreting context)
Conditional	Strategies rehearsal collections of problems with the same deep structure)	Describing relationships between the problem and the choice of strategy (proof reasoning)

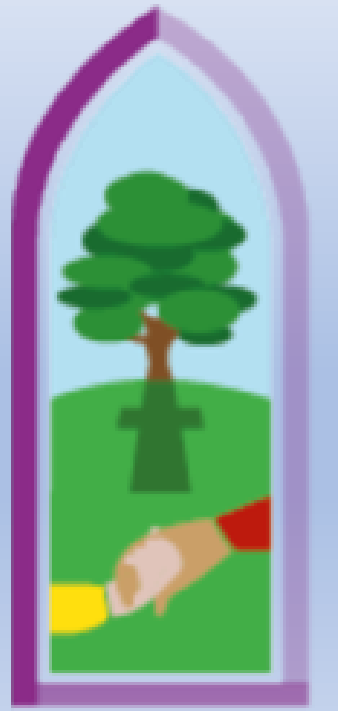
Mathematics INTENT

Mathematics is a language and understanding this is a key curriculum objective which will enable children to respond to a range of mathematical questions and problem-solving.

Mathematics and the understanding of how this is central to the universe can be breath taking and spiritually lifting. Understanding how the universe operates along mathematical lines can make you wonder about a higher order and purpose of the universe.

Culturally children and adults in the UK can be overwhelmed and express a negative view about their mathematical ability. We aim for all children to build their knowledge and expertise through effective sequencing, modelling and step by step support.

Mathematics is a rich and engaging subject, varied in its real life applications. By opening children's eyes to the real life links that mathematics offers, we enrich their understanding of the world around them.



Early Years

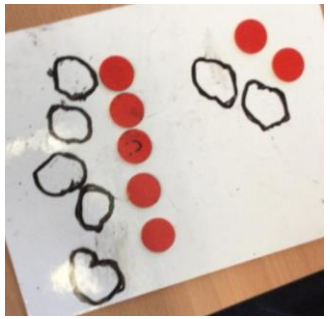
At Beechcroft, we understand the importance of early experiences of maths and significant emphasis on developing a strong grounding in number – understanding that this is a necessary building block for children to excel in the subject. The two key ELG's for mathematics are: 1. Number: Number composition, subitising, recall of bonds to 5 and 10 and doubling 2. Numerical Pattern: Verbally count beyond 20, Compare quantities, explore and represent patterns

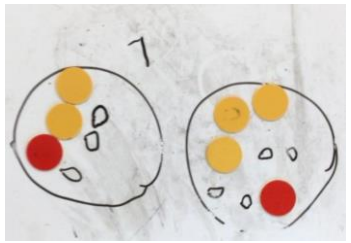
Children are encouraged to be mathematicians who:

- Notice maths by saying what they see.
- Think mathematically, making links and connections to what they know.
- Talking mathematically.
- Being curious about what they see / hear / experience / manipulate in maths.
- Make sense and form connections for themselves.
- Respond to questions to provoke thinking i.e. Are you sure? How do you know?
- see and manipulate maths structure through careful choice of visual/ representation/manipulative.
- Record maths learning as part of sense making.

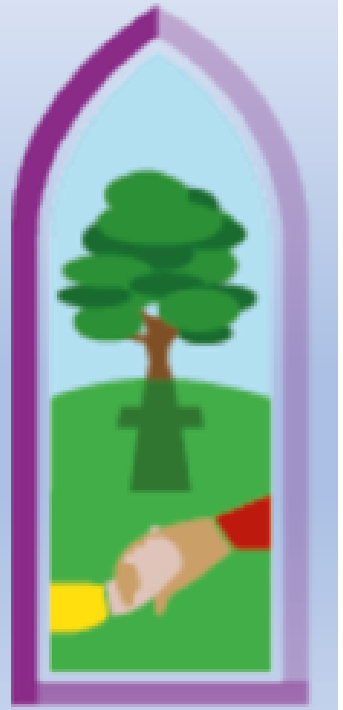
We use White Rose Maths as our vehicle, which has a clear sequence of content and progression of vocabulary, knowledge, skills and conceptual understanding. Planning and therefore teaching and provision nurtures secure mathematical thinking and understanding, rather than children 'doing' maths but being unable to explain the mathematical content. Careful consideration is given to representations / manipulatives which best support conceptual understanding. Daily maths learning, including maths lessons, enables all children to access the full curriculum.

In addition, we utilise the wealth of expertise available through the National Centre for Excellent Teaching of Mathematics and are continuing to take peart in the 'Mastering Number' programme, which runs from reception until the end of year 2, focussing on early mathematical fluency.





Mathematics
IMPLEMENTATION



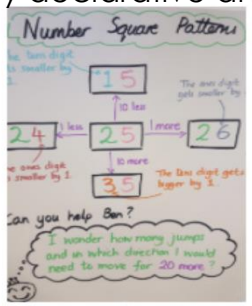
Vocabulary
Mathematical language is also integral to mathematical understanding and we prioritise the teaching of reading and speaking (oracy) in maths. **Language development** is a key feature of our curriculum. STEM sentences and key vocabulary below are a useful bridge to development of oracy in maths.

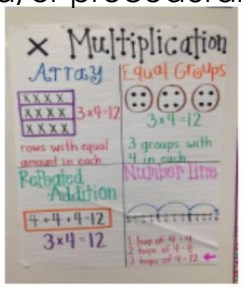
Problem solving

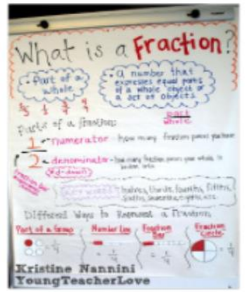
We understand that children need to develop both declarative and procedural understanding in a topic, which with explicit teaching of the links between them will build, overtime, to an understanding of the strong relationship between them. In turn, **providing a strong basis for problem-solving. Children need to be taught how to solve specific problems and how to choose strategies**. Therefore, our teachers teach useful topic-strategies as well as how to match them to particular types of problem. Encouraging core-systematic problem-solving methods.

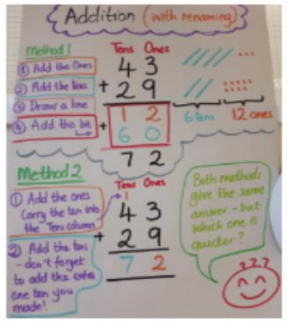
The balance between new content and **the need to rehearse** is key to the consolidation process. Regular opportunities to revisit core curriculum content are built into the curriculum.

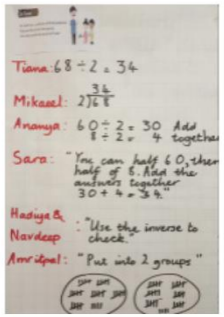
Anchor tasks are designed by the class teacher and are displayed in books/ on working walls/ on washing lines, to provide a reference tool. They demonstrate key declarative and/or procedural concepts and are designed to aid learning.

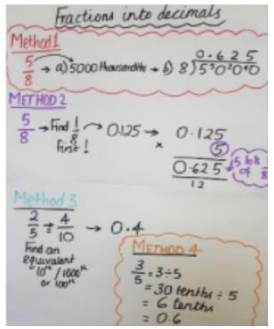






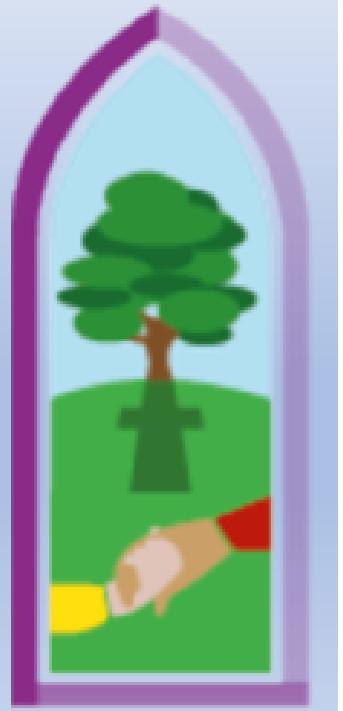






Mathematics

IMPLEMENTATION



Task design
When setting tasks we aim to use **intelligent variation** so children build their understanding of:

The range and boundaries of operations
The importance of patterns and rules
Connections between varying problems
Pattern seeking habits
How to focus
Logical and systematic approaches to problem solving

Teachers provide models and questions which are carefully curated.

At risk groups more specifically require:

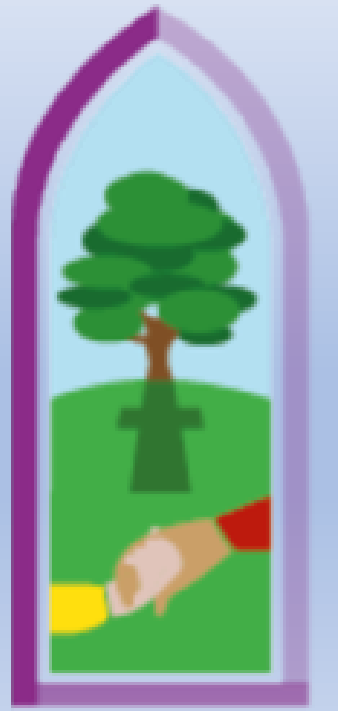
- Carefully scaffolded approaches to declarative and procedural knowledge
- Carefully modelled and ever available worked examples
- Responses to gaps identification – not always re/pre-teaching – but sometimes more time to practice.
- Systematic instruction
- Gradual, clear and consistent explicit language instruction
- Homework which provides consolidation and is centered around procedural fluency
- High quality talk/peer discussion
- At risk groups particularly benefit from practice in a near silent environment.

They need exposure to a blend of Type 1 and Type 2 learning.

Assessment is mostly characterised by frequent low-stakes testing. Where children have learnt all the facts, methods and strategies to be tested. Periodically, incorporate timed testing to help children learn facts to automaticity. They also support children to prepare for termly summative testing.

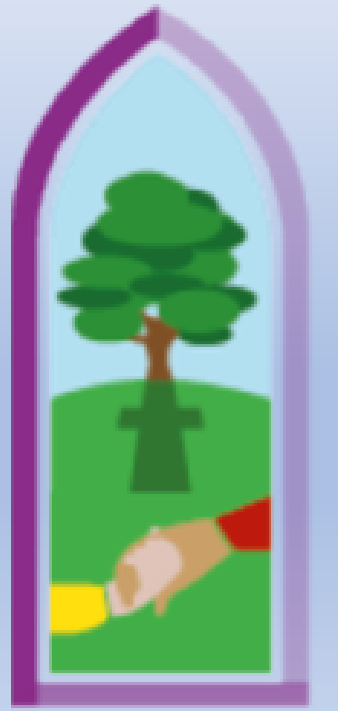
In summary, our curriculum intends to offer content and delivery which observe the features and approaches of a successful mathematics education and intend to ensure that mathematical concepts and understanding will be learnt overtime. WRM infrastructure together with the application of the very latest in teaching research provides the back-drop for overall success of our relatively novice learners.

Mathematics



Mathematics

IMPACT



At Beechcroft, the expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. We aim for each child to be confident in each yearly objective and develop their ability to use this knowledge to develop a greater depth understanding to solve varied fluency problems as well as problem solving and reasoning questions. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly are challenged through rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material consolidate their understanding, including through additional practice, before moving on. Where necessary, earlier material should consolidate their understanding, including through additional practice, before moving on.

Formative Assessment: Teachers carry out formative assessment through AfL in each session and feedback is given to children verbally, through self/peer assessment and through marking. Teachers then use this assessment to influence their planning. Children are rapidly identified as needing further challenge or additional support, and we ensure that this is provided in a timely manner.

Low Stakes Quizzing and Fluent Recall: We use a range of low stakes testing throughout the teaching cycle to assess attainment and progress.

Summative Assessments: Our assessment calendar includes 3 key dates for capturing progress and attainment against National Curriculum Objectives. Assessments are carried out in autumn, spring and summer terms.

Subject Monitoring: We regularly monitor the quality and impact of our mathematics curriculum through targeted learning walks, book scrutiny and pupil interviews. In addition to this, we survey our staff and pupils to identify their perception of mathematics and identify CPD needs.