

Maths Policy

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Teaching and Learning in Maths

Subject Identity: Maths

Fingerprint Statement

Mathematics is a subject that develops pupils' understanding of number, pattern and relationships, enabling them to think logically, reason systematically and solve problems with confidence. Through the use of practical resources, visual representations, structures, abstraction and real-life contexts, pupils explore mathematical ideas, strive for mastery and make connections across different areas of learning, while being encouraged to explain their thinking, identify patterns and apply their knowledge with accuracy, reasoning and justification. Maths builds pupils' conceptual understanding as well as procedural through knowledge that is hierarchical and cumulative.

Core Concepts and Themes

Mathematics is rooted in making sense of numbers, structures and relationships through reasoning and generalisation.

The key concepts are:

- **Number and Place Value** - Understanding quantity and magnitude of numbers and how they are composed, ordered and represented, whilst recognising the value of each digit within a number.
- **Additive and Multiplicative Relationships** – Understanding how numbers and operations relate and connect
- **Pattern and Generalisation** – noticing, describing and extending structure
- **Representation and Structure** – Using models to reveal mathematical ideas
- **Reasoning** – Justifying, explaining and providing mathematical thinking

Together, these concepts support pupils in developing fluency, reasoning and problem-solving skills, enabling them to make connections across mathematics and apply their learning with confidence.

Disciplinary Ways of Thinking

These foundations are brought together through mathematical thinking, which represents the disciplinary approach of the subject.

This includes:

- Reasoning
- Generalising
- Representing
- Problem-solving to make sense of mathematical ideas and structures

Through this approach, mathematics develops a pupil's capacity to think mathematically by reasoning about number, structure and relationships.

Teaching and Learning Documentation

In order to communicate effectively each of our subject areas, key documentation is established by the Subject Leader and shared with all relevant teaching staff. This documentation includes: -

1. Subject Policy
2. Curriculum Rationale
3. Unit of Study Overview
4. Knowledge and Skills Overview

Together, this documentation collates the coverage and implementation of Maths across the Academy.

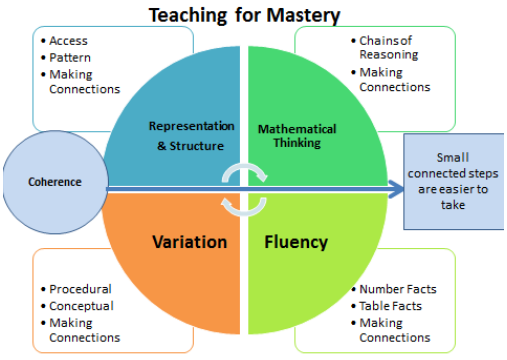
Subject Leadership and Monitoring

In addition, Subject Leaders are required to monitor the effectiveness of their subject throughout each academic year. In order to do this with effect, the following documentation is established and updated regularly.

1. **Subject Audit** – An audit of the subject is completed annually RAG rating the effectiveness of the subject, whilst informing key priorities moving forward.
2. **Subject Action Plan** – A three-point action plan is derived from School Development Plan priorities and the subject audit to establish next steps as we continue to strive to improve each subject area.
3. **Learning Enquiry** - As part of our monitoring cycle, our Learning Enquiry approach ensures the monitoring of each subject area through scheduled book looks, learning walks, planning/ resource checks, pupil voice and staff voice. All findings are collated, feedback is shared and next steps are actioned.

Delivery of Maths and lesson content

Mathematics is taught across the school using Early Learning Goals in Foundation Stage, and moving on to the National Curriculum in Key Stage 1 and Key Stage 2. At Ribbon, we pride ourselves on being an inclusive school, and this is reflected in our philosophy about teaching and learning mathematics. We have high expectations that all pupils can and will achieve, and this has led to us adopting a 'mastery' approach to planning and teaching maths. The mastery approach is defined by five key principles, which are illustrated in the diagram, below



FLUENCY INVOLVES:

- Quick recall of facts and procedures
- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics

REPRESENTATION & STRUCTURE

Mathematical structures are the key patterns and generalisations that underpin sets of numbers – they are the laws and relationships that we want children to spot. Using different representations can help children to 'see' these laws and relationships.

VARIATION

Procedural variation – This is a deliberate change in the type of examples used and questions set, to draw attention to certain features.
Conceptual variation – When a concept is presented in different ways, to show what a concept is, in all of its different forms.

MATHEMATICAL THINKING INVOLVES:

Looking for pattern and relationships
Logical Reasoning
Making Connections

COHERENCE

Teachers should develop detailed knowledge of the curriculum in order to break the mathematics down into small steps to develop mastery and address all aspects in a logical progression. This will ensure deep and sustainable learning for all pupils.

Foundation Stage

The teaching and learning of Mathematics within the Foundation Stage forms the foundation of future learning within the subject. Mathematics is planned using the Early Years Outcomes and progress measured towards the Early Learning Goals. There is a continuous provision of Mathematics based activities around the whole foundation stage setting and resources can be found in each area. In addition to this, enhancements are added based on the mathematical needs or interest of the children. These enhancements may change daily. As the year progresses, children in Reception move on from the use of Microsoft Powerpoint as a means of evidencing progress to individual pupil books.

Lower Phase

Throughout Key Stage 1, children are encouraged to learn using concrete and pictorial examples, before moving on to more conventional methods using abstract symbols. Children are taught through a 40-60 minute daily Mathematics session and a 15-20 minute Number Sense session (<4 times per week), to ensure they become confident and proficient in a range of mathematical concepts. Mathematical thinking and problem solving are incorporated into all mathematics lessons, allowing children to apply their knowledge and develop conceptual understanding and logical reasoning skills. Ongoing formative assessment, alongside end of unit and termly summative assessments, enable the teachers to plan to address any gaps in pupils' learning.

Upper Phase

During Key Stage 2, children are able to build on the strong foundations and understanding secured in Key Stage 1. The C-P-A (Concrete-Pictorial-Abstract) approach is continued, with the emphasis being on developing a deep understanding of mathematical structures, to minimise misconceptions and encourage fluency and flexibility when dealing with mathematical concepts. Children are taught through a daily 45-60 minute Mathematics session, and a 15-20 minute Number Sense or Arithmetic session, every day. Mathematical thinking and problem solving are incorporated into all mathematics lessons, allowing children to apply their knowledge and develop conceptual understanding and logical reasoning skills. Ongoing formative assessment, alongside end of unit and termly summative assessments, enable the teachers to plan to address any gaps in pupils' learning.

National Curriculum

Long Term planning is taken from the objectives in the National Curriculum, which are broken down into the following units of work:

1. Number: Place Value
2. Number: Addition and Subtraction
3. Number: Multiplication and Division
4. Number: Fractions (including decimals and percentages)
5. Ratio and Proportion (Y6 only)
6. Algebra (Y6 only)
7. Measurement
8. Geometry (Properties of Shapes)
9. Geometry (Position and Direction)
10. Statistics

Units 7-10 are taught as applications of the first 6 units, wherever possible, so that relationships between areas of maths can be made explicit.

Children are given a range of strategies to solve calculations relating to the 4 operations. They are taught and encouraged to understand procedures by working with concrete and pictorial materials, before moving on to the more abstract symbols. The importance of understanding is stressed rather than the children simply learning 'the tricks of the trade'. ***Please refer to the 'Ribbon Academy Calculation Policy' for more information.***

Lesson Content

Memory Jogger:

At the start of each lesson, a 'memory jogger' is used where the teacher splits the IWB into four-quadrants and prepares four retrieval activities to support children to recall and practice prior maths learning. This includes content from their current year group and previous year groups. The skills and knowledge may at times link to the new learning for the upcoming lesson. As the children move up through KS2, the memory jogger consists of more questions to allow the revisiting of further topics.

Rewind to Recap:

The teacher will explicitly discuss with the children, how today's learning builds on learning from previous year groups and/or topics.

New learning:

New learning is shared with a clear and understandable 'Can I statement'. Links to progression and essential knowledge is made explicit.

Sharing of Mastering Maths activity:

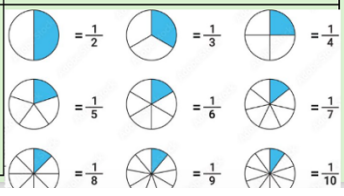
The teacher takes a moment to showcase an advanced 'Mastering Maths' problem to the children, showcasing the possibilities of the new learning, on the future abilities of the learner.

Vocabulary:

Key vocabulary with a consistent definition, example and an image (where possible) is shared with the learners to support their understanding of the concepts being taught. Here is a an exemplar grid:

Ribbon Academy

Maths Vocabulary We need for this lesson

Key Vocabulary	Definition	Example sentence	Picture (if supportive)
Denominator	In common fractions, the number written below the line i.e. the divisor.	The denominator in 3/5 is 5.	$\frac{3}{5}$ ← numerator ← denominator
Numerator	In common fractions, the number written on the top i.e. the dividend.	The numerator in 3/5 is 3.	$\frac{3}{5}$ ← numerator ← denominator
Unit fraction	A fraction that has 1 as the numerator and whose denominator is a non-zero integer. Example: ½, ⅓	½ and ¼ are unit fractions	

Guided practice: -

In order to develop familiarity and confidence with a procedure, guided practice is used to breakdown procedures and knowledge in manageable steps supporting learners to become more fluent.

Concrete/ Pictoral/ Abstract: -

The CPA approach is used to develop an understanding of the abstract concept by using both concrete and pictorial representations of the number/ procedure.

Independent practice: -

To support application of learning, children are given opportunity to practice independently. Teachers will ensure assessments are made, and feedback is given to overcome any misconceptions and correct errors.

Task Design

Children are given a range of strategies to solve calculations relating to the 4 operations. They are taught and encouraged to understand procedures by working with concrete and pictorial materials, before moving on to the more abstract symbols. The importance of understanding is stressed rather than the children simply learning 'the tricks of the trade'. ***Please refer to the 'Ribbon Academy Calculation Policy' for more information.***

There is an expectation that pupils will use practical methods, jottings and formal methods to 'experience' mathematical situations, and that they will develop their mathematical thinking through a range of question types. The following list (though not exhaustive) exemplifies the type of questions pupils will experience in their time at Ribbon:

- What do you notice?
- What is the same / what is different?
- Can you give an example / prove it?
- Can you explain why (using a number sentence / diagram / in words)?
- Can you find another way to do it?
- True or false…? / Is this statement correct?
- What is the missing number (complete the number sentence / pattern)?
- Do you agree? Why is this correct / not correct?
- What COULD the answer be? What could the answer NOT be? Why?
- How many different ways can you find to do it?

Independent Practice

To support independent practice, activities will be designed to support fluency, problem solving and reasoning. Tasks will be applicable to one of three categories. These categories are to be used flexibly to best support the success in learning of the concept or procedure.

The three categories include:

Building Awareness:

Confidence developing activities to provide exposure and practice to develop accuracy.

Developing Depth:

Application of new learning with an increased level of complexity to deepen understanding of the concept/ procedure.

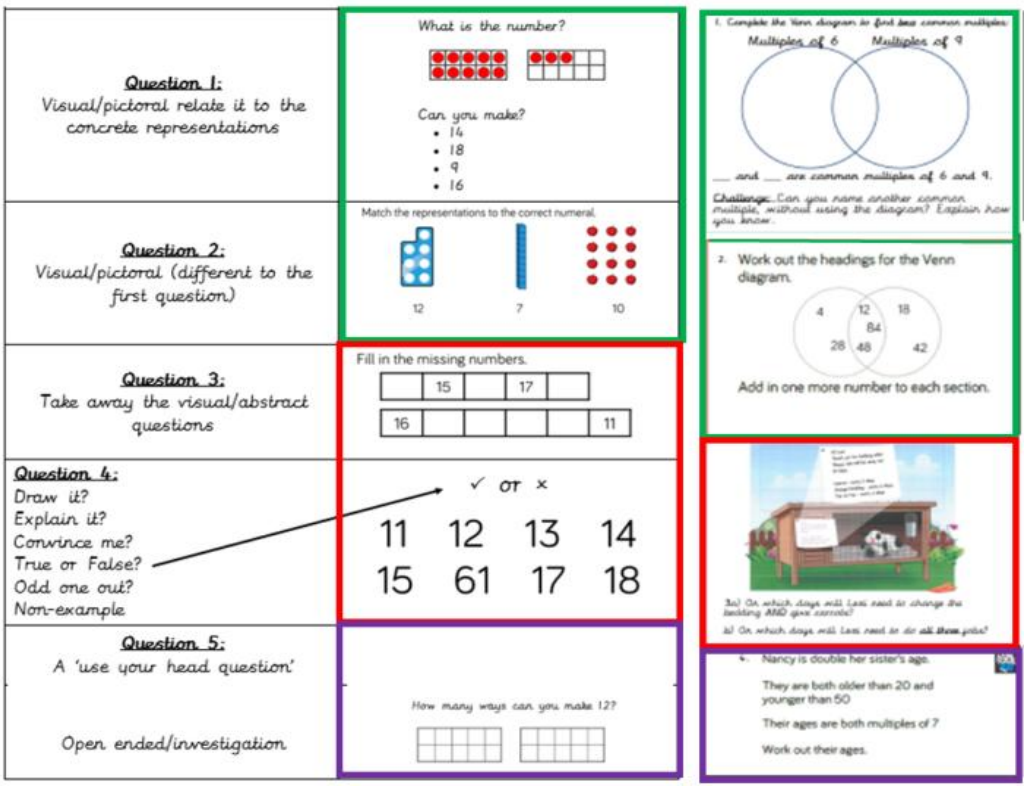
Mastering Maths:

Problem solving and/or reasoning activity to support application of maths learning, which requires more than one step and/or explanation of learners understanding.

Support / Scaffolding Learners

As well as support from adults, concrete resources are used to scaffold children with their understanding. These resources help children to visualise, explore and 'manipulate' objects, to develop their understanding. Talk / learning partners also support children who are less confident to engage in the lesson through discussing their ideas with a peer or group. In Early Years, Year 1 and 2, the team bases have mathematical areas, in which there are a variety of concrete resources to support daily lessons. From Year 3 - Year 6, each classroom has a 'Maths Toolkit', which supports this at a more age-appropriate level. For any topic specific concrete resources, they can be found in the 'Maths Zone'.

Differentiation within lessons is 'through depth', meaning that all learners start the lesson together and are included in the whole-class exploration of the maths. Then, children are encouraged to go as 'deep' with their learning as they can, working through a series of increasingly challenging questions and tasks. This diagram shows a KS1 and KS2 example of how a resource sheet might '**differentiate through depth**':



NB. The 'Building Awareness' stage is introduced during Year 1, as children move from informal to more formal recordings. By the Summer Term, in Year 1, it is expected that the majority of the children will be able to begin accessing the 'Developing Depth' stages in preparation for all three stages in Year 2.

'Building Awareness' Stage

'Developing Depth' Stage

'Mastering Maths' Stage

'Greater Depth' Challenge

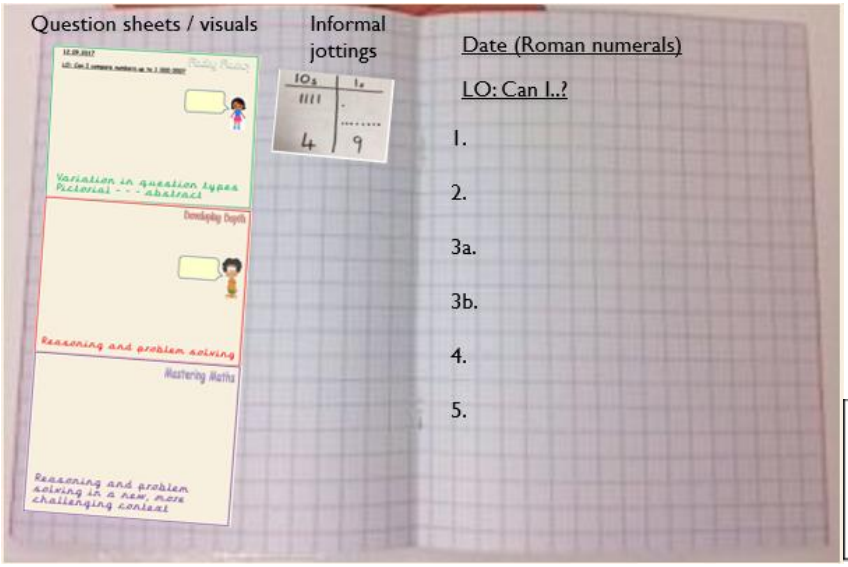
While ALL children are encouraged to 'master the maths', there are **challenge sheets** available in all lessons to enrich and extend the learning of children who grasp concepts quickly. These sheets are stuck in the back of children's books so that they can work on them over a series of lessons, if appropriate. These children are encouraged to act as 'experts' in whole-class sessions.

'Pause' times also enable teachers to model problem-solving to quick learners, using '**rich tasks**', while other children consolidate their learning. Teachers will 'pause' at key times during a mathematics unit and identify children who need additional support, children who need to consolidate their learning and children who are ready to be challenged. Adults will then spend a lesson or two delivering focused support to these groups, before resuming whole-class teaching, within mixed classes. Work undertaken during 'pause' sessions will be recorded in books, as per usual practice.

Performance and Learning Evidence

Evidence collation is key to support the learning process and the monitoring of Teaching and Learning by Subject Leaders and Senior Leaders. In order to evidence Maths effectively, the following strategies have been implemented: -

- Reception – Floorbooks moving to books
- Year 1 – Maths books and Earwig
- Year 2 > 6 – Maths books and Maths jotters



Some mathematical learning is not always able to be captured in books and therefore is evidenced through Earwig (relevant photographs and videos), particularly in KS1 when more practical/concrete resources are used.

Please note: - Earwig is an online storage system used to evidence in class discussions and activities that contribute to the evidence of knowledge and skills of our learners

Number Sense (or Arithmetic)

Additional to maths lesson, each year group will have up to 4 'Number sense sessions' per week. These sessions focus on the deep understanding of concepts, numbers and fluency with procedures developing confidence in maths.

The design of these sessions and the content used to plan and deliver these sessions varies depending upon the year group. Please see the breakdown below:

- **Reception** – NCETM Mastering Number
- **Year 1** – NCETM Mastering Number
- **Year 2** – Autumn/ Spring 1 – NCETM Mastering Number
- **Year 2** – Spring 2/ Summer – LAP NCETM Mastering Number/ HAP Number Sense*
- **Year 3** – Number Sense*
- **Year 4** – Number Sense*
- **Year 5** – Autumn- Summer 1 – Number Sense*.
- **Year 5** - Summer 2 – Arithmetic
- **Year 6** – Arithmetic

*Please note a 'Number Sense' session consists of four clear sections:

- Fluency Facts – Focus on number fact retrievals
- Key skills – Rehearsal of skills to develop accuracy, fluency and efficiency.
- Variation and connection – An opportunity to explore connections across mathematical concepts through variation practice.
- Procedural practice – Rehearsal of essential mathematical procures.

Assessment

As per our Marking and Feedback policy, adults formatively assess throughout the entire learning sequence, ensuring proactivity and responsivity to the needs of all children. This feedback can be verbal or written feedback. Adults mark every 1 in 3 pieces with peer and self-marking taking a predominant role

At the conclusion of each topic, teachers will input a grade (Beginning, Embedding, Secure or Higher – in line with our assessment policy), which outlines where each child is working at. This grading enables the Maths leader to quickly identify any trends across school regarding the different areas of learning. This grading will be taken from a combination of evidence in books, verbal feedback and performance on end of unit quizzes.

Cross-curricular Links:

As well as through discrete mathematics lessons, it is important that children are able to recognise when the application of mathematical skills and concepts is appropriate in other subjects across the curriculum. This will help children to see mathematics as a broad and varied subject, and to apply it in a range of contexts. When planning for other subjects, teachers should identify opportunities for developing mathematical skills and learning. The table below contains some ideas for applying mathematics within a range of curriculum subjects, but it is up to individual teachers to decide when, and in which units of work / topics, mathematics can be used to enhance and deepen learning.

Science	Data handling, such as tables, bar charts and line graphs; measuring and comparing, e.g. temperature, time, volume; converting units and using simple equations; angles, e.g. refraction
ICT / Computing	Position and direction, e.g. Roamer/Beebot/Logo; sensing equipment and spreadsheets / databases for the handling of statistics; geometry using graphics or coding programmes
History	Calculation of dates and timelines; alternative number systems e.g. Roman numerals
Geography	Calculation of time difference; co-ordinates; statistics, e.g. bar charts, line graphs and pie charts
Music	Number pattern and timing (counting beats)
D&T	Measuring e.g. lengths, times, volumes; fractions, ratio and proportion, e.g. within food technology
P.E.	Statistics, such as mean; measuring, e.g. distances and times; position and direction; point scoring
Art	Geometry, e.g. symmetry, properties of shape, angles, reflection, translation and rotation

Resources

Key teaching aids which support with the delivery of maths:

Magma Maths (Y2–Y6)
Provides instant feedback and extra practice on taught concepts to support fluency and correct misconceptions.
TT Rock Stars (KS1–KS2)
Boosts rapid recall of times tables through engaging, competitive practice across both key stages.
NumBots (EYFS–KS1)
Builds fluency in number bonds, addition, and subtraction through self-paced, game-based learning.
White Rose One Minute Maths (KS1–LKS2)
Supports fluency in number facts (doubles, halves, addition, subtraction) through quick, daily practice.
White Rose Resources (Whole School)
Offers high-quality, sequenced lesson materials to support consistent, mastery-based maths teaching.
Grammarsaurus Resources (Whole School)
Offers high-quality, sequenced lesson materials to support consistent, mastery-based maths teaching.
Testbase (Y2–Y6)

Provides standardised assessments and abstract problem-solving tasks to support tracking and challenge.

NCETM (EYFS – Y2)

Offers high-quality, sequenced lesson materials to support fluency, recall and number composition.

Shared mathematics resources and equipment are labelled and stored in the 'Maths Zone'. To ensure resources are easily and safely accessible, the zone should be kept organised and tidy at all times. Teachers should return resources when they have finished using them. If there is a particular resource which teachers feel they require in their classroom long term, they should discuss this with the Mathematics Leader, as it may be necessary to make a requisition for the purchase of more equipment. The Maths Zone contains a range of mathematical equipment, including:

- Dice
- Number Lines
- Numicon
- Place Value Dienes (Base 10 resources)
- Pegboards and Pegs
- 2D and 3D shapes
- Unifix and multilink
- Rekenrek