Beaminster
St. Mary's Academy

Where children come first; belonging and building together
Respect † Trust †Kindness †Friendship †Responsibility

# Maths

# Policy

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**Date reviewed: Autumn Term 2022**

# Mathematics Policy

## 1 Rationale

Mathematics is a tool for life. To function in society, we all need to be able to communicate mathematically, and to do so is to transcend cultural, racial and language boundaries. It is an opportunity to remind ourselves of the fundamental human curiosity and creativity that connect us all. Maths is a lens through which we can better make sense of the world around us, allowing us to describe, to illustrate, to interpret, to predict and to explain. The utility of Maths is unquestioned, and there is much to be gained in the appreciation of its aesthetics too.

## 2 Aims

2.1 In our teaching of Maths at Beaminster St. Mary's, we hope to:

- instill a fascination for Maths and foster an enduring love of number and the manipulation of numbers
- develop an appreciation for the practical uses of Maths, as well as its aesthetic nature.
- help pupils recognise that Maths is a search for pattern and relationship
- support pupils to become active, confident mathematicians, providing opportunities for pupils to demonstrate and use their Maths in everyday situations
- constantly facilitate opportunities for mathematical thinking and discussion
- help pupils to understand that Maths is a powerful tool for communication
- encourage pupils to take responsibility for their own learning

## 3 Objectives

3.1 The national curriculum identifies three main aims in the primary phase. Our children should:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that they 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
- 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.

3.2 Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The National Curriculum programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across these ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. The distinct domains highlight the important areas of mathematics children need to learn to make effective progress.

These domains for KS1 are:

- Number and place value
- Addition and subtraction

- Multiplication and division
- Fractions
- Measures
- Geometry: properties of shape
- Geometry: position and direction
- Statistics (Year 2)

These domains for KS2 are:

- Number and place value
- Addition and subtraction
- Multiplication and division
- Fractions (including decimals and percentages)
- Ratio and proportion (Year 6)
- Measures
- Geometry: properties of shape
- Geometry: position and direction
- Statistics
- Algebra (Year 6)

# 4 Teaching and learning

## 4.1 Organisation

### 4.1.1 Progression

In the Foundation Stage, Key Stage 1 and Key Stage 2, children are taught in class groups. The majority of children will move through the programmes of study at broadly the same pace. Decisions about when to progress are always based on the security of children's understanding and their readiness to progress to the next stage. Children who grasp concepts rapidly are challenged through being offered 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.

### 4.1.2 Curriculum time

Maths will be taught daily, in the morning, with a session lasting 60 minutes. During the session, content following the progression of skills will be delivered, with number sense and fluency skills and interventions addressed within this time.

## 4.2 High quality lessons

In addition to the quality first teaching outlined in the Teaching and Learning Policy, the following additional factors are hallmarks of the effective teaching and learning in our Mathematics classrooms.

### 4.2.1 Teaching for mastery

#### Coherence

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

### Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation. Teachers explicitly link concrete, pictorial, symbolic and language-based representations.

### Mathematical Thinking and Maths Talk

For taught ideas to be understood deeply, they must be worked on by the student: thought about, reasoned with and discussed with others. Children are expected, through questioning, prompts and classroom culture, to convince themselves and others of their ideas, articulating them coherently using correct mathematical language. Teachers use and expect pupils to use correct mathematical vocabulary.

### Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics are worked on rigorously, usually in the mini sessions in the afternoon, but opportunities are created throughout every session to work on, and apply, procedural fluency.

### Variation

Teachers represents the concept being taught in more than one way to draw attention to critical aspects, and to develop deep and holistic understanding. Variation theory is also employed in the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, encouraging children to attend to what is kept the same and what changes, and consequently to connect the mathematics and draw attention to mathematical relationships and structure.

## 4.2.2 Lesson structure

Work is carried out using a balance of individual, paired and group work. Sessions will look and feel different depending on the requirement of the small steps of learning that day, but typically sessions will contain the following subsections:

- Recap on prior learning
- Anchor task
- Teacher directed learning
- Guided and independent practice
- Deeper thinking

## 4.2.3 Concrete – Pictorial – Abstract (C-P-A)

Bruner's modes of representation (1966) and, more specifically, the C-P-A adaptation of the model form the foundation of all of our maths. This is evident in every lesson, with children offered a rich diet of exploration with concrete objects, and building a depth of understanding through the explicit linking of their associated iconic and symbolic representations. The role of the teacher is that of a facilitator who guides children through the concrete, pictorial and abstract levels of understanding by providing appropriate scaffolding and feedback. See our calculations progression in the appendices for a breakdown of the different representations.

## 4.2.5 Use of manipulatives

The cognitive transitions between concrete, physical examples, pictorial representations, symbolic notation and language underpin our approach to maths teaching at Beaminster St. Mary's. With this in mind, all concepts are introduced, supported and consolidated using manipulatives so that deep structural understanding is engendered at every phase of mathematics learning. Children of all abilities, in all classes, at all stages of difficulty have carefully guided

access to a range of manipulatives perfectly suited to that sessions learning.

The teacher will model the use of a particular manipulative, as well as the recording of its use in journaling, where appropriate. Familiarity with the range of manipulatives grows over time, and our children become adept at independently employing them as tools in their maths.

#### 4.2.6 Misconceptions

Addressing common misconceptions proactively is a key part of our maths strategy, and the likely misconceptions for each small step are carefully planned for. The teacher might offer the class a problem that particularly lends itself to children falling into a common 'trap', before taking the time to evaluate their method and unpick the problem. Each class also has a mathematically clumsy character who always makes mistakes, and when the teacher presents them with a completed problem, children become used to appraising their characters' erroneous solutions.

#### 4.2.7 Maths struggle

Becoming 'stuck' is embraced in our maths classrooms, and children are equipped with a growing set of strategies to be able to independently 'unstick' themselves. The following questions make up the 'stuck' rubric that children learn to ask themselves, after intensive modelling by the teacher:

- What do I know?
- What do I want to know?
- What do the words mean?
- Can I state the question in my own words?
- Can I depict the situation on a diagram?
- Can I simplify the problem first?

In this way, passivity is minimized and children learn to take on the responsibility of becoming unstuck themselves. Maths struggle, over time, becomes a positive experience, is seen as transient and embraced as a learning opportunity.

### 4.3 Working walls

Working walls constantly evolve throughout a block of learning, and teacher journaling is added every lesson. Children are expected to refer to them throughout the session. Our maths working walls contain:

- relevant mathematical vocabulary
- visual representations (including pictures of manipulatives)
- teacher's journaling
- procedural examples
- deeper thinking prompts
- Sentence stems

### 4.4 Marking and feedback

The following points are subject-specific additions to the guidance outlined in the marking policy.

- Independent tasks are marked (teacher, self or peer) live
- Deeper thinking activities are acknowledged in books and used formatively to grow understanding of pupils' thinking and misconceptions.
- Live feedback is acted upon in the session, with children correcting mistakes in purple pen.

### 4.5 Calculators

The regular use of calculators is introduced near the end of Key Stage 2 to support pupils' conceptual understanding and exploration of more complex number problems, once written and mental arithmetic are secure. Calculators are used in lower years, albeit infrequently, as a way to self-check answers.

# 5 Curriculum and planning

### 5.1

Our curriculum coverage is informed by the White Rose Maths Hub (WR) schemes of learning and WR and NCETM progression maps, and lesson content is informed by National Curriculum objectives, WR block overviews and NCETM Mastery PD materials. The WR long term plan (LTP) is used as a guidance tool in order to pace out coverage of the curriculum throughout the year. Teachers use professional discretion when deciding on how long is needed on particular curriculum areas whilst ensuring all objectives are covered by the end of the academic year.

### 5.2 Planning

#### 5.2.1 Long term

The WR schemes of learning are used to ensure coverage. Four, or more, units are covered over a term, and these scheme allows for a week of consolidation at the end of each term. See appendices for example LTP and block overviews.

#### 5.2.2 Medium term

Medium term planning is key to our whole approach. Teachers prepare detailed plans, based on pre-assessment data, NCETM PD materials, WR block overviews, National Curriculum objectives and knowledge of the class's strengths and weakness. These plans form a road map of small steps of learning through a block.

#### 5.2.3 Short term

Short term plans give added detail about lesson structure, formative assessment points, different representations, differentiation and deeper thinking opportunities, on a session-by-session basis.

A key part of the short term plan are the teacher and TA reflections on the lesson. These notes inform the direction of the learning, changes to the next lesson/s, guided groups, as well as any intervention required in the afternoon mini-sessions.

### 5.3 Times Tables Rock Stars

We use the Times Tables Rock Stars progression of times tables tests in the classroom to support the the speed of recall in years 2 to 6. We also use the online platform, encouraging use at home.

# 6 Differentiation and SEND

### 6.1 Our SEN policy and Equality scheme should be read alongside the following information.

- teaching is organised to enable pupils of all abilities to access learning
- during lessons, pupils may work in groups on scaffolded tasks linked to the learning objectives of the lesson/block. These groups are never static, and children are grouped on a lesson-by-lesson basis through

formative assessment

- in-line with our mastery approach, and in order for children to move through content at broadly the same pace, scaffolds are in place to support lower attainers, and challenge is embedded into every section of a maths lesson. This includes 'Thinking Deeper' activities, 'Thinking Deeper' question prompts and teacher questioning throughout the course of a lesson
- intervention programmes are used to support children who are at risk of not meeting age-related expectations. Extra lessons may be offered to help those children who have difficulties

# 7 Assessment

7.1 Assessment is a vital tool in the teaching of Mathematics, designed to monitor children's progress and measure attainment. It is also used to inform future planning. Teachers are responsible for assessing and recording children's progress in mathematics.

7.2 Assessment opportunities are built into the planning of lessons and a range of other methods are used as appropriate. These include:

- continual formative assessment through the course of sessions, weeks, units and terms
- children's work marked and in accordance with the school marking policy and maths policy
- completion of the Foundation Stage Profile on-entry and at the end of the school academic year
- statutory tests (SATs) at the end of Years 2 and 6
- Multiplication Check scores recorded and tracked by the teacher for Years 3 and 4
- listening to what children say and questioning them to ascertain their level of understanding
- termly Teacher Assessments recorded on Insight to facilitate tracking and analysis
- observations of individuals or groups, looking for particular skills or concepts to be demonstrated
- half-termly in-school moderation of children's work to agree and check the standards of attainment

Teachers assess the standard of work against the key objectives for each year group and compare and moderate work to standards as displayed in the national curriculum. This data is recorded and assessed through Insight. Termly Teacher Assessments reviewed to facilitate tracking and target setting and support the monitoring of children's progress.

Ongoing formative and summative assessment across the year inform the Teacher Assessment which, in turn, informs Parent Consultation evenings and the end of year reports. As a statutory requirement, the report will include whether a child has reached end of year age-related expectations in mathematics.

# 8 Monitoring and review

8.1 Monitoring of the standards of children's work and of the quality of teaching and learning in mathematics is the responsibility of the mathematics subject leader, the Headteacher and the class teacher.

The Head teacher, senior leadership team and governors monitor the curriculum and pupil progress by working closely with the Mathematics Subject Leader.

8.2 The main roles and responsibilities of the mathematics subject leader include:

- providing leadership and direction in Mathematics
- supporting school improvement in mathematics
- monitoring and evaluating the quality of teaching and learning in Mathematics

- identifying specific training and support for staff
- teaching model episodes and lessons, and team teaching to support staff CPD
- monitoring Maths planning and delivering feedback to staff
- monitoring books frequently and providing whole staff or individual feedback when necessary
- monitoring termly progress and providing feedback
- analysis of KS1 and KS2 SAT results, pupil response, teacher assessments and other standardised assessments
- managing, auditing and updating resources
- liaising with the governor responsible for maths, other schools and the LA
- coordinating the review and updating of the policy when necessary
- ensuring the Mathematics Action Plan is implemented, monitored, evaluated and reviewed in line with the AIP

8.3 This policy will be reviewed in Autumn Term 2023