



**Talavera Junior School**  
**MATHEMATICS POLICY**

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## Introduction

At Talavera Junior School we believe that a high-quality mathematics education equips pupils with a foundation for understanding the world, the ability to reason mathematically and an appreciation of the beauty and power of maths. Our Teaching for Mastery curriculum enables children to understand and appreciate relationships and patterns in both number and space in their everyday lives.

We believe that this mastery approach to teaching and learning mathematics is the most effective way to foster that enjoyment and curiosity and develop life-long learners with the secure strategies required to solve problems by applying their maths knowledge. Our approach to maths is inextricably linked to a growth mindset and key principles to support all children's learning, including those with EAL. Through their growing knowledge and understanding, they also learn to appreciate the contribution made by many people to the development and application of mathematics.

### **It is our aim to develop:**

- A belief that by working hard at maths they can succeed.
- A growth mindset about ability to learn mathematics and encourage children to apply the school motto '*Every Learning Minute Counts.*'
- A positive attitude towards mathematics and an awareness of how fascinating elements of mathematics can be
- Competence and confidence with numbers and the number system and other mathematical knowledge, concepts and skills
- Problem solvers, who can reason using mathematical terminology; think logically; work systematically and apply their knowledge of mathematics to new and unfamiliar contexts
- An ability to communicate using mathematical language
- An ability to work both independently and with others

## Teaching and Learning

**Teachers' planning and organisation:** we follow a mastery approach through which:

- pupils are taught through whole-class interactive teaching, where the focus is on all pupils working together on the same lesson content at the same time, as happens in Shanghai and several other regions that teach maths successfully. This ensures that by using a '*small steps*' approach, all children can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.
- those who fail to grasp a concept or procedure are quickly identified and early intervention ensures the pupil is ready to move forward with the whole class in the next lesson.
- pupils who grasp concepts rapidly are challenged through being offered rich and sophisticated problems before any acceleration through new content.
- children are helped to make sense of concepts through lessons which identify the new mathematics that is to be taught; the key points, the difficult points and carefully sequenced small steps take children on a learning journey that also considers how concrete and pictorial representations of concepts can be used to support children's understanding.
- procedural variation and fluency, and conceptual understanding are developed in tandem because each supports the development of the other.

- intelligent practice, as a vital part of learning, is used to reinforce pupils' procedural fluency and develop their conceptual understanding and children are able to learn and embed key facts.
- significant time is spent developing deep knowledge of the key ideas that are needed to underpin future learning. The structure and connections within the mathematics are emphasised, so that pupils develop deep learning that can be sustained. Opportunities to
- key facts are learnt to automaticity to avoid cognitive overload in the working memory and enable pupils to focus on new concepts

Within a unit of work, the time spent on teaching a specific learning objective or set of learning objectives depends on the needs of the children.

Lessons follow a flexible, multi-part structure to allow for continuous Assessment for Learning opportunities. The lesson structure allows opportunities for children to talk about a mathematical concept; notice patterns or reason about a structure or procedure; make connections between concepts and solve problems which are modelled and explained using the mastery principle of **I do, We do, You do**. They will be a combination of some or all of the following parts:

- 1) Daily fluency task - focus 3/4 or daily 5; use of reasoning questions arising from NFER assessments and arithmetic assessments and/or times tables practices
- 2) Let's talk - a rich (open-ended) investigation or discussion that allows children to notice and discuss maths
- 3) Let's learn - the teaching of a concept and/or skill
- 4) Let's play - a game or activity that allows children to explore the concept being taught and investigate potential solutions
- 5) Let's practice - an opportunity to practice skills to answer questions (using manipulatives if appropriate)
- 6) Let's apply - an opportunity to apply knowledge gained to a similar problem and/or a different context. This could be an assessment opportunity (use of a marking sticker) or an exploration of a generalisation

At each stage, opportunities to discuss ideas, use worked examples and non-examples, practice independently or in small groups.

All teachers plan daily mathematics lessons (of between 1 hour and 1.5 hours) using an agreed planning format. This must be planned using the Key Performance Indicators (KPIs) detailed in the medium-term plans. Planning is done on a weekly basis, although it may well be adapted on a daily basis as a result of ongoing assessment for learning. Planning is guided by key documents such as the DfE 2020 National Primary Curriculum Guidance, the Ready to Progress criteria contained within it and the NCETM Spines.

The aim is that children see mental calculation strategies as their first 'port of call' - only resorting to written strategies, if there is no appropriate mental alternative. A daily mental maths session must take place outside of and in addition to the daily lesson. This must be planned using the mental maths objectives detailed in the medium-term plans (MTPs). Within Years 3 and 4, fluency with number facts and times tables knowledge is supported by the use of the *Number Sense* programmes for these lessons. Years 4 and 5 are also following the NCETM's *Mastering Number* programme to develop children's reasoning and understanding around multiplicative facts.

Planning includes learning objectives, success criteria, brief explanations on what the teacher will be modelling, key vocabulary, key open questions and differentiated activities.

Where possible teachers pre-empt 'big' misconceptions that many children will have (taken from the MTPs) - e.g., a rectangle/oblong has four lines of symmetry (diagonals). Teachers also plan which vocabulary they will use and which models, images and concrete resources they will use to aid learning.

Effective plenaries are only part-planned as misconceptions may arise during the teaching of the lesson. However, all plenaries refer to the learning outcome and the success criteria in a meaningful way, allowing children some time for self-assessment and reflection.

We ensure that across each term, children are given a range of experiences in maths lessons including practical activities; mathematical games; group and individual problem-solving challenges and open investigations; group, pair and individual discussions; and both open and closed questions to answer.

We ensure that children can use a range of methods to calculate and have the ability to check whether their chosen methods are appropriate, reliable and efficient.

Consistent representations and progressive strategies are outlined in each year group's MTP including the use of both mental and formal calculation strategies. These ensure representations and structures are familiar to the children as they progress throughout the school and they are able to draw on their prior experiences to help solve new problems.

### **Flexible groupings and adaptations**

Our staff have high expectations of all children, irrespective of ability, and encourage them to be successful and achieve their full potential. Our aim is to move away from the traditional approach of differentiation (where children are grouped by ability and set different tasks accordingly) to ensure challenge for all. Instead, the class moves broadly together through a unit of work. For children who are finding it difficult to master the concept(s), they will be supported by an adult during the lesson; complete a slightly adapted task or have immediate intervention after the lesson (but before the next lesson). They will also have the opportunity to use manipulatives to scaffold their understanding when their peers may not need to use them.

Children are encouraged to have a growth mindset about their ability to do mathematics. Encouraging children to 'have a go' is seen as paramount, in order to facilitate self-discovery. We aim to apply the Talavera value of **resilience** to help children develop the ability to persevere at tasks and learn that it is ok to struggle or "be stuck as it's fantastic when you get unstuck!". Teachers direct children to the correct level of challenge based on their assessments in the initial phases of the lesson.

Adaptation of tasks is undertaken in various ways:

- Open ended questioning and activities which allow more able children to offer more sophisticated mathematical responses;
- Intelligent Practice questions are a key feature of teaching for mastery is the precise designing of pupil activities and practice questions. This ensures that, rather than pupils repeating a mechanical activity, they are taken down a path where the thinking process is practiced with increasing creativity and they are able to begin to make connections between areas of maths;
- Recording e.g.: allowing some children to give verbal responses and photographing their learning;
- Resourcing e.g.: use of concrete apparatus such as Dienes, multilink, number lines and bead-strings to support some children. Children are encouraged to develop an independent approach to using such apparatus and may decide to use them independently;

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- Grouping of low attaining children with significant gaps in knowledge: so that they can have focused teaching to close those gaps. These may mean they have different learning objectives and tasks from the rest of their year group or may be working through the same objectives at a slower pace. The aim of these flexible groupings will always be to return those children to learning centred on their year group's curriculum;
- Adult support: children are given additional adult support during the lesson;
- Immediate Intervention: children are given additional support outside of the main lesson, but before the next lesson; and
- Pre-teaching: children may (where appropriate) undertake pre-teaching of concepts.

Part of independent work often involves some focused, targeted group work from the teacher. However, groupings are 'fluid and flexible' based on the children's performance in a previous lesson or the beginning of that particular lesson.

Where Teaching Assistants are available, they are fully briefed before the lesson and use the same teaching methods modelled by the teacher to support individuals or groups. In some cases, they may also model concepts to the class, allowing the teacher to assess particular groups of children in more detail and identify their next steps.

### **Special Educational Needs**

Children with SEN are normally taught within the daily mathematics lesson. When additional staff are available to support groups or individual children, they may withdraw small groups to use intervention materials.

Within the daily mathematics lesson, teachers not only provide activities to support children who find maths difficult but also activities that provide appropriate challenges for children who are higher achievers. Support and alternative activities are explicitly signposted on planning flipcharts.

### **Equal opportunities**

All children should have equal access to the curriculum, irrespective of particular circumstances such as race, background, gender and capability. In the daily mathematics lesson, we ensure this by supporting children in a variety of ways; for example: repeating instructions, giving visual instructions or picture cues (Widget) and emphasizing key words etc.

### **Vocabulary and precision of language**

Developing children's language and vocabulary **is absolutely essential.**

- in all lessons, attention is given to whether key vocabulary has been learnt;
- key vocabulary is shown on interactive whiteboards and/or working walls during lessons and instantly added to as new words arise;
- paired talk activities are used to encourage children to talk about their mathematics;
- teachers insist that children mirror the language they hear the adults using and use STEM sentences to scaffold;
- where appropriate, children are encouraged to answer in full sentences;
- adults mirror back alternative words for the same meaning to enrich children's range of vocabulary. E.g. Child says '3 times 5 is 15', teacher says, 'yes, the product of 3 and 5 is 15' or '3 multiplied by 5 equals 15';

- children are required to provide justification and reasoning for their answers. A clear feature of teacher talk will be the word *Why?* Children will be asked to prove something is true or not true through the use of examples, near examples and non-examples. EG: "I know the shape is a square because ... but I know it can't be a \_\_\_\_\_ because ...";
- teachers are required to have sound subject knowledge and understanding of the correct terminology and vocabulary and they refer to the school's glossary of maths terms if unsure. E.g. There is no such thing as a 'take away' sum (because 'sum' means 'add'). We use the terms 'calculation' or 'equation'.
- lax terminology such as '*carrying*' and '*borrowing*' must not be used. The correct terminology should reflect the mathematical structure. In this case, the terms '*regrouping*' and/or '*repartitioning*' are appropriate, since they reflect the way the numbers are being changed flexibly, whilst retaining the same value.
- at all times, teachers should refer to the maths subject leader if there is any uncertainty over terminology in order to maintain a consistent school-wide approach.

### **Working Walls**

All classrooms have a clear working wall where models, vocabulary and visual images used in previous lessons are displayed and referred to. Children use these to support their learning. Working walls are to include the following:

- Key vocabulary for the topic being taught only
- Modelling of strategies and the apparatus relevant to the topic being taught
- Areas displaying children's work
- An area where children can share their own ideas and solutions or respond to challenges set by the teacher

Further guidance and non-negotiables are provided in the curriculum folder

### **Cross-curricular Links**

Throughout the whole curriculum opportunities exist to extend and promote mathematics. Teachers seek to take advantage of all these opportunities within our topic-based curriculum. Each year group will teach one picture book unit per term.

### **Pupils' Record of Work**

There are occasions when it is both quick and convenient to carry out written calculations. It is also important to record aspects of mathematical investigations. Children are taught a variety of methods for recording their work and they are encouraged and helped to use the most appropriate and convenient method of recording.

All children are encouraged to work legibly when recording their work. When using squares, we encourage children to use one square for each digit.

### **Marking**

The quality of marking is crucial. All work is marked daily to show the children where they have succeeded and where errors have been made. The priority for the teacher, when marking, is to pick-up on some misconceptions/errors and using next steps to provide some examples for further challenge. This will be achieved through the use of one of the following:

- Challenge sticker
- Close the Gap sticker
- Explanation sticker

When appropriate, the children themselves can mark exercises, which involve routine practice with support and guidance from the teacher. Peer marking may also be used.

Please refer to the Feedback and Marking policy for further detail.

### **Homework**

It is our school policy to provide parents and carers with opportunities to work with their children at home. These activities may only be brief, but are valuable in promoting children's learning in mathematics. The school has subscribed to the TT Rockstars and Numbots programme and all children are encouraged to use the platform for further practice at home. In Years 4 - 6, children are given weekly written homework, which allows for further practice of the previous week's learning or to assess that knowledge and concepts taught in previous months and/or terms has been retained.

### **Ongoing Assessment for Learning**

Formative assessment is the main mode used to gauge progress and inform planning. The learning objective (and the success criteria) are referred to during the lesson to gauge progress and at the end of the lesson to assess progress.

Teachers monitor and assess children throughout the lesson and through marking their work, identifying any misconceptions which need to be addressed.

Assessment should also be guided by the key DfE 2020 National Primary Curriculum Guidance and the Ready to Progress criteria contained within it.

### **Record Keeping**

Teachers use their own short assessment tasks using resources such as the NCETM Mastery Assessment materials and *Ready to Progress* assessment questions. The work set, combined with a scrutiny of children's recorded work over the previous weeks, helps to review how well children have taken in the topics taught and identifies any remaining misconceptions.

### **Summative Assessment**

Year 6 will sit their annual SATS testing (along with regular practice papers) and Year 4 will undertake the government's Multiplication times table check in June each year. Formal assessment will take place through teacher assessment at the end of each phase. In years 3 -5, this is informed by termly NFER assessments with results being analysed and data used to inform planning.

### **Reporting to Parents**

Parents are given the opportunity to discuss their child's progress at two parents' evenings but understand that the schools' 'open door' policy enables them to address concerns throughout the year. Reports are completed before the end of the summer term. Teachers use the information gathered from their assessments to help them comment on individual children's progress.

### **Monitoring and Evaluation**

The mathematics subject leader is given opportunities to work alongside other teachers. This time is used to monitor and evaluate the quality and standards of mathematics throughout the school and enables the subject leader to support teachers in their own classrooms. Opportunities for teachers to review the mathematics policy are given on a regular basis during staff meetings.



## **Role of the Subject Leader**

- To take the lead in policy development
- To support colleagues e.g. leading staff CPD, planning support, team teaching, arranging participation in CPD opportunities offered by the Maths Hub etc
- To monitor and be accountable for progress in Mathematics - this may be done through scrutiny of work, observations and analysis of formal assessment data
- To take responsibility for the choice, purchase and organisation of central resources for Maths, in consultation with colleagues
- To liaise with other members of staff to form a coherent and progressive scheme of work which ensures both experience of, and capability in, Mathematics
- To be familiar with current thinking concerning the teaching of Mathematics, and to disseminate information to colleagues

The subject leader will report on mathematics to the Headteacher and will liaise with the named linked governors.

