

WEST TWYFORD PRIMARY SCHOOL

MATHS POLICY

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Introduction

Mathematics equips pupils with the uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem solving skills and the ability to think in abstract ways.

Mathematics is important in everyday life. It is integral to all aspects of life and with this in mind we endeavour to ensure that children develop a healthy and enthusiastic attitude towards mathematics that will stay with them.

The national curriculum for mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics, including the varied and regular practice of increasingly complex problems over time.
- **Reason mathematically** by following a line of enquiry, understanding relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- Can **solve problems** by applying their mathematics to a variety of problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

At West Twyford we have adopted the Singapore Maths approach to teaching and embedding the above knowledge and skills.

Singapore Maths

The Singapore method of teaching mathematics develops pupils' mathematical skills and confidence without having to resort to memorising procedures to pass tests - making mathematics more engaging and interesting.

The Singapore method of teaching mathematics is based on research from a variety of sources. The work of educational psychologist Jerome Bruner and Richard Skemp's work on relational and instrumental understanding are some of the sources.

The CPA Approach

One of the key learning principles behind the Singapore maths textbooks is the concrete- pictorial-abstract approach, often referred to as the CPA approach. The concrete-pictorial-abstract approach, based on research by psychologist Jerome Bruner, suggests that there are three steps (or representations) necessary for pupils to develop understanding of a concept. Reinforcement is achieved by going back and forth between these representations.

Concrete representation

The enactive stage - a pupil is first introduced to an idea or a skill by acting it out with real objects. In division, for example, this might be done by separating apples into groups of red ones and green

ones or by sharing 12 biscuits amongst 6 children. This is a 'hands on' component using real objects and it is the foundation for conceptual understanding.

Pictorial representation

The iconic stage - a pupil has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem. In the case of a division exercise this could be the action of circling objects.

Abstract representation

The symbolic stage – a pupil is now capable of representing problems by using mathematical notation, for example: $12 \div 2 = 6$

Every new concept is introduced using this approach, from the foundation stage through to Year 6.

Lesson Structure

Children are seated in mixed ability groupings. The Singapore Maths lesson typically includes the following components: Anchor Task, Journaling, Guided Practice and Independent Practice.

The Anchor Task

This part of the lesson is the 'hook' to the mathematical concept the children will be learning that lesson. This task is usually contextualised. It should engage pupils through exploring multiple methods and involves a high level of teacher-pupil and pupil-pupil interaction/questioning. This kind of questioning prompts pupil metacognition, visualisation, pattern recognition and generalisation, all of which are characteristics of the Singapore Approach.

The Journal

Maths journaling is an opportunity for pupils to provide a visual and written reflection on which key method(s) work for them. They are then able to compare their own understanding to that of the textbook. They can identify common methods and reflect upon what they have understood as the learning that day. This can also be used to extend learners and deepen their understanding by challenging them to write a word problem for a friend.

Guided Practice

During Guided Practice, pupils are looking at procedural variation (the different ways a problem can be presented). They complete the activities collaboratively and with support to embed the learning before independent work.

Independent Practice

During Independent Practice, pupils have the opportunity to reinforce concepts by solving a range of problems in a work book.

Mind Workout

These activities really stretch learners and allow them to apply their mathematical knowledge on complex problems.

On some days, pupils will also be involved in consolidating activities in small groups or pairs

Teaching and Learning

- Tasks will be differentiated according to the pupil's needs and learning styles.
- Teaching and learning within this curriculum area will reflect the principles of Singapore Maths Strategies.
- Use of Maths No Problem online teacher resources, textbooks and workbooks.
- Children's work will be monitored by regular marking by the class teacher, often during the lesson.
- Feedback is given to reflect the visible learning approach.

Resources (Financial, Human, Material)

In order to successfully to teach Singapore Maths, the school commits:

- To have Maths No problem textbooks and workbooks available in the class room.
- To have practical resources in the classroom and in a central resource area which enables children to obtain practical equipment necessary for the task, therefore using and applying their knowledge and developing the CPA approach to learning Maths.
- To enhance mathematics teaching by appropriate use of the computer, internet and visual aids e.g. interactive software programmes
- To whenever possible, provide extra adult support for group work and SEN provision.
- To clearly identify purpose and task for all adults involved in class activity.
- To liaise with all adults involved about planning tasks, recording and monitoring.

Non-Negotiables

Non-negotiables have been put in place that all children should be able to do by the end of each school year (unless there is a specific need). This is to ensure that all children have the best chance of success each year and ensures there is a stable maths grounding for the teachers in the following year. Non-negotiables are attached in the appendix. Teacher are expected to regularly review these to ensure all children will have met these by the end of the academic year.

Monitoring & Evaluation

Continuity of Maths through Key Stages will be planned for by utilising the following strategies:

- Allow children to check and correct their own work, set their own targets and to peer assess.
- Use formative and summative assessment for future planning and assessment for learning. This is most effective when assessment is done with the child while they are working and misconceptions are addressed immediately so that learning objectives can be achieved.
- Implementation of Maths No Problem formal tests to be undertaken at the end of each unit (reviews).
- Implementation of a programme of formal testing to include Yr 2, Yr 6 SATs, termly NFER tests for Yr 1 (Summer only), Yr 3, Yr 4 and Yr 5.

- Teacher Assessment recorded on Target Tracker as an ongoing assessment and planning tool.
- Liaison between teachers, Maths Leaders and the SMT to ensure Maths curriculum is being implemented and recorded.
- Maths Leaders and SMT to check children's work at regular intervals for appropriate differentiation, curriculum coverage and informative assessments. Maths Leaders to check once a half term with follow up support given. SMT to hold termly book looks.
- Maths Leaders and experienced staff to team teach with others to support subject knowledge and skills.

Early Years

- To provide children with the foundation of numbers and spatial awareness through structured play, exploration, questioning, investigation, songs and rhymes, in accordance with curriculum guidance for the EYFS.

Cross Curricular

- To identify Maths in all areas of the curriculum e.g. data handling in Science, co-ordinates in Geography, chronology in History and pattern in R.E. and to use Singapore Maths strategies in teaching and learning across the curriculum.

Equal Opportunities

- To provide equal access to the mathematics curriculum irrespective of gender, race, ethnicity and socio-economic background.
- To be aware of the specific needs of children with English as a second language when using mathematical vocabulary and to use resources such as Emas to support them.

S.E.N

- To be aware of special individual needs and to ensure children are working at appropriate level and to provide practical resources and plan differentiated material.
- Ensure pupils with SEN receive top quality support from the class teacher, SEN teachers and learning support staff.
- All children, regardless of their needs, should participate in the anchor task.

Health and Safety

- Children will be taught to handle apparatus safely in line with health and safety requirements.

ICT

- Use of Mathematics and Education City to provide opportunities for learning at home.
- Use of Interactive resources to teach Singapore Maths e.g. 'Geoboard'

**Reviewed by R Ahmed & M McHale
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