

The Teaching of Mathematics at Greasby Junior School

Teachers at Greasby Junior School have been developing a mastery approach for the last three years, inspired by the exceptional performance of some Southeast Asian countries. The 'Maths No Problem!' textbook was the only textbook listed on the DfE (Department for Education) list of recommended textbooks, released in July '17.

In classrooms you can expect to see high levels of pupil engagement and involvement. Lessons begin with an interesting and engaging problem to solve and the teacher's role is to make this accessible to all. Concrete materials (usually in the form of representations or manipulatives) are often used to support the children's thinking as they explore. Pupil talk should be encouraged at every opportunity, enabling peer support, challenge and/or refinement of ideas. Through these, learning should be highly visible. Teachers use pupils' ideas to create a series of class discussions in which all are encouraged to participate, often attempting to see into the minds of those offering the ideas. Different ideas are embraced and discussed. The class will spend a significant length of time reflecting on their own and others' ideas: they do this through journaling and exploring the thinking of others as presented in the textbook. Towards the end of each lesson, the children practise what they have learned, usually through a number of examples guided by the teacher and ultimately, independently. The sequence of examples presented in the textbook is usually adhered to, the inbuilt variation enabling the children to practise the same kind of problem in a number of different ways. Differentiation is precise and robust; struggling learners are mainly supported through concrete materials, peer dialogue and problems that are in real life situations whilst the more able learners are challenged from the outset, being asked to prove or justify their ideas, create real-life authentic problems of their own or seek patterns within the problem/concept being explored.

Journals and workbooks are used in most lessons. Journals are used to develop pupils' communication skills and record children's thought processes, therefore deepening conceptual understanding. Once children have had the opportunity to refine their thinking, they are expected to record this using diagrams/drawings, writing and abstract mathematical notation. Teachers' expectations of journals should be high, as should independence levels. Additional expectations of gifted mathematicians should be overt. Workbooks should be used to record children's independent practice. You may find teachers asking children to annotate their work, explore further, or write similar problems of their own.

Lesson planning is different from lesson design. The textbook has lessons that have been designed by expert mathematicians, psychologists and researchers. The teachers' role is to use it as a tool and to bring the lesson to life for the children. As such, mathematics planning should demonstrate that the teacher has understood the lesson, identifying the key learning outcome(s), any particular barriers and opportunities to stretch the gifted mathematicians. In this way, the textbook becomes a supportive tool for teachers and, consequently, helps develop pedagogical subject knowledge.

The **impact** of a mastery session should be visible – planning should identify what the children’s learning should look like (what you expect to hear and see in the room) hence making it straight-forward to assess the quality of learning. If for some reason the teacher is unable to progress in the lesson (eg because of a misconception), s/he will take time to consider the most effective next steps. At times this will involve allowing children time to struggle without teacher intervention (to develop resilience and allow for exploration), and at other times it may lead to immediate intervention in the lesson. Feedback ‘in the moment’ should help children to address misconceptions. Feedback in lessons is mainly oral, though you may see teachers marking journals and workbooks whilst the children are writing in them. Marking after the lesson is in line with national guidance – if everything is going as it should, a simple acknowledgement will suffice (eg a tick). If something is wrong, the teacher will recognise it and show the pupil the correct way. An intervention may be necessary. If the whole class (or significant part of it) has a misconception, the teacher’s planning of tomorrow’s lesson will demonstrate how remediation is to take place and there may be no reference to it in individuals’ books.

Children’s views: in line with other successful nations, we anticipate that the approach won’t mean that all children love mathematics in school. Instead, we are looking for children to believe that they can do mathematics and to dispel the myth that the ability to do mathematics is an innate capability that only some children possess. Currently, children tell us that they like talking about their work and like being in control of it.

Teachers’ views: we like the fact that mathematical content has been laid out for us and we have noticed that the children are more confident and ‘with us’ for longer in the lessons.