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Date	October 2016
Key stages	KS1
School type	LA maintained, infant
Themes	Mathematics

Using the mastery approach to mathematics

Brookland Infant and Nursery School

Context

Brookland Infant and Nursery School is a larger than average-sized infant school located in the Broxbourne district of Hertfordshire. In October 2013 the school was rated as 'good' by Ofsted.

Brief Description

Since 2014 the national curriculum for mathematics has been re-designed to raise standards in mathematics inspired by methods currently used in South-East Asian countries such as Singapore, Japan and China. The mastery in mathematics approach is characterised by the principles that all pupils are capable of excelling in mathematics and that pupils progress through the curriculum at the same pace but differentiation is achieved by emphasising deep knowledge through individual support.

At Brookland Infant and Nursery School teaching for mastery in mathematics gives access to the curriculum to all pupils and allows them to explore and reason with maths. In May 2015 the school took part in the Herts for Learning (HfL) Fluency Project which inspired a few teachers at the school to pioneer the mastery approach to maths in their classrooms from September 2015. Ros Daniels, Year 2 teacher, was one of these teachers and was also inspired to use the approach after attending the course. Since then the school has designed new teaching sequences for learning instead of lesson plans in both Year 1 and Year 2.

Teaching for mastery in mathematics

Differentiation

One of the key principles behind mastery is that all pupils can achieve high standards in maths and should move through the curriculum at the same pace. As a result one of the first steps that Brookland Infant and Nursery School took was to stop grouping pupils by ability, removing fixed expectations of performance. Differentiation is now achieved through the wide range of work available. In lessons pupils have the chance to either consolidate and deepen their learning through more complex questions or have extra teacher input and intervention if they are struggling.

Purposeful planning

The shift to the mastery curriculum requires new approaches to lesson design as pupils no longer have to move through the curriculum at a pre-determined pace. Teachers no longer plan lessons in rigid blocks and determine the next lesson based on the outcome of the last, only introducing new content when all pupils achieve breadth and depth of previous content. To support teachers to plan sequences the school arranged a whole staff inset day and a consultation day lead by a Herts for Learning Primary Teaching and Learning Adviser.

Classroom ethos

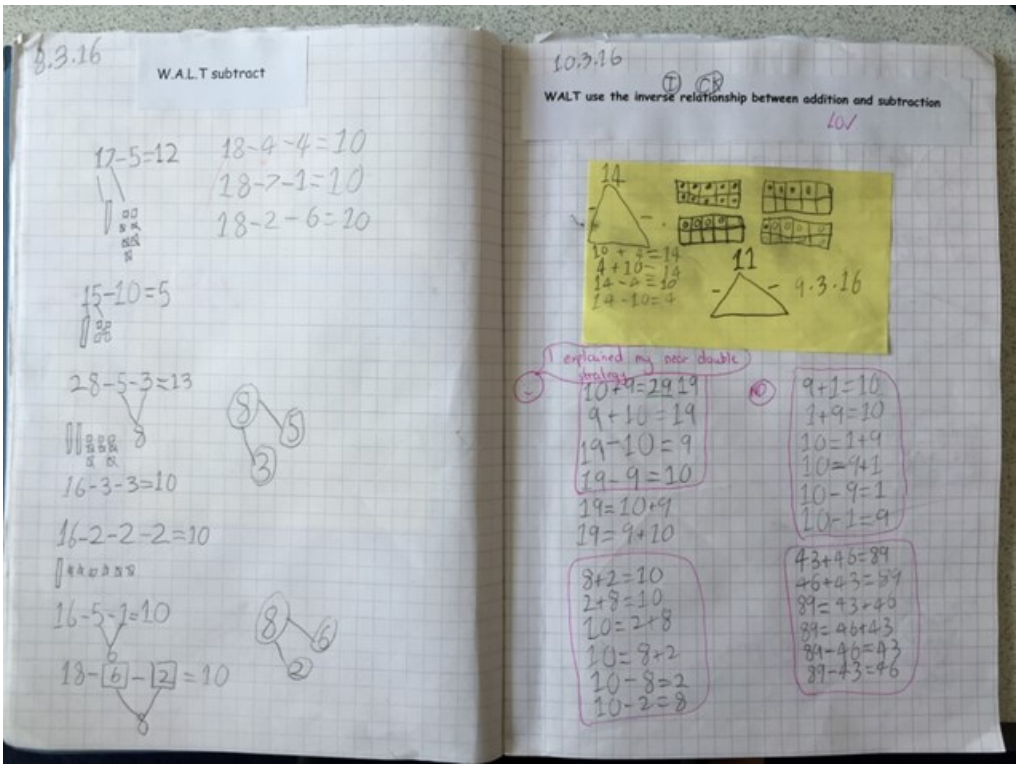
Maths lessons across the Brookland Infant School now include more discussion time. Pupils talk about their learning journey (how they resolved the answer to a particular problem) in their maths books as well as to each other. Teachers do not discourage any method of getting to the correct answer as the approach is more about discovering and innovating through pupil's views.

Embedding the CPA approach

Previously several pupils at Brookland Infant School were still using traditional 'counting' methods to solve problems. To overcome this the school introduced the concrete-pictorial-abstract (CPA) approach; one of the key principles from the mastery approach. This approach suggests that there are three representations necessary for pupils to understand a concept; concrete, pictorial and abstract. With the concrete resource a pupil is first introduced to an idea or a skill by acting it out with real objects, for example, solving problems using counting blocks and the part whole model. Pupils pictorially represent those experiences to diagrams and pictures of the problem through drawing. This could be circling objects for division into groups in their exercise books. The abstract representation pupils use numbers, symbols and language with greater understanding when representing their mathematics.

The school moved away from worksheets and invested in carefully chosen concrete resources such as tens frames to support pupils' conceptual knowledge of work. This is then reinforced by the increased use of pictorial methods seen in pupils' textbooks.

Pupils at Brookland Infant School solving a problem using concrete resources with teacher Ros Daniels



A Year 2 book demonstrating how pupils solve problems using the pictorial approach and explain their learning journey

Impact

Ros Daniels feels positive about the impact of teaching for mastery in the school. Pupils enjoy maths a lot more than before and this is reflected in the improved classroom ethos. Very few pupils interrupt each other when talking and even start to spontaneously work in pairs. Pupils are also much more confident with exploring and writing down their learning journey and are no longer worried when they do things in a different way to someone else. Removing ability groups has been beneficial for lower attaining pupils, who are demonstrating strengths in certain topics which previously they would not have explored in a lower ability group.

Using concrete and pictorial methods has resulted in pupils making better progress, delving deeper into the topic and grasping new concepts faster than before. Year 1 pupils are showing examples of being at the abstract stage in mathematics; for example when told that the Queen was born in 1926 in a history lesson, a pupil's response was 'that means she is 90 years old.' Meanwhile it is clear that pupils in the school who have not been exposed to the mastery approach yet are still relying on traditional counting in maths lessons.

Pupils previously thought of as high attaining pupils are now able to explore their mathematics in more depth , are better able to communicate their thinking and have a greater range of strategies to call on.

Next Steps

The school is aware that adopting the mastery approach is not a simple journey and will continue to develop teaching and learning approaches to further embed it into all classes and all year groups.

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Related documents and links	**http://brooklandinfants.herts.sch.uk www.hertsforlearning.co.uk/sites/default/files/user_uploads/10_excellence/closing_gaps/documents/fluency_project_research_report.pdf**

If you have an aspect of interesting practice that could be shared or are interested in finding out more about a case study please get in touch by emailing exchangingexcellence@hertsforlearning.co.uk

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