

## Mastery in Mathematics; Information for Parents

In September 2016, Kea Community Primary School began transitioning towards a mastery approach to the teaching and learning of mathematics. We aim to achieve this within three years. The rationale behind changing our approach to teaching mathematics lay within the 2014 National Curriculum, which states:

- The expectation is that most pupils will move through the programmes of study at broadly the same pace.
- Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content.
- Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Why are we changing the way we teach mathematics?

“The content and principles underpinning the 2014 mathematics curriculum reflect those found in high performing education systems internationally, particularly those of east and south-east Asian countries such as Singapore, Japan, South Korea and China. The OECD suggests that by age 15 students from these countries are on average up to three years ahead in maths compared to 15 year olds in England.

What underpins this success is the far higher proportion of pupils reaching a high standard and the relatively small gaps in attainment between pupils in comparison to England.”

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What do lessons look like now?

- ***The whole class works together on the same learning objective***

We have always had a strong emphasis on every child making progress in every lesson and this was achieved through differentiation with different groups working at different levels. Now the emphasis is on keeping the class together until specific concepts or skills are mastered and then moving on together.

This does not mean that children who pick up skills more quickly will be held back, simply that they will be stretched in a different way through problem solving and reasoning questions. For example, once a child in Y3 has learned how to add  $367+489$ , they will not then move onto  $1367+1489$ , but will be asked to use their knowledge to work out  $367+4\square\square=856$ .

Children who need more time to pick up new skills will be supported by using manipulatives (counters, cubes, base 10 materials) and be given extra support from the teacher or a TA during the lesson. Occasionally, a child may be withdrawn from other lessons for a brief consolidation session with their teacher or TA to ensure that they keep up.

- ***challenge provided by going deeper not accelerating***

For those children that have mastered the skill, concept or procedure they will be presented with higher order thinking activities, rather than accelerating through the curriculum. (See above.)

- ***focused, rigorous and thorough teaching***

Within mastery the idea is to focus on one small step at a time in a lesson, with an emphasis on the mathematical structures involved and the best way to represent these through models and image. If you are unsure of the way your child is being taught a new concept, ask them to show you. If they are unable to do this, then consult the teacher. He/she will then explain things to your child with you listening so that you can hear the language that is being used and be better able to support them at home. Each small step is important as it builds towards deep understanding of a concept so please avoid teaching tricks or methods that you learnt at school as this may confuse the child in the next lesson, even if they appear to have understood your method at home.

- ***more time on teaching topics – depth and practice***

The same topic is likely to have the same focus until the class has mastered the concept, skill or procedure being taught. This is particularly the case for number and calculations. This means that children will be spending longer at a time on topics, especially calculation topics, rather than dipping in and out and revisiting during the year. There are smaller steps of progress and the extra time is for practice and depth, making the learning effective.

- ***CPA***

This stands for concrete, pictorial, abstract. We start with showing the children pictures or diagrams to help explain the concept, eg an egg box when working out  $3 \times 2$  or  $6 \div 3$ . We then allow the children to work things out using place value counters, blocks or other manipulatives. Once they have a good idea of *why* it works, they are then taught to draw pictures or diagrams for themselves in order to solve problems (see example below). Only then are they taught abstract formal calculation methods. This is the way we teach all the way up to Year 6, and ensures the children have a full understanding of what they are doing when they perform a calculation.

- ***Fluency, Reasoning, Problem Solving***

Lessons or units of work have three parts:

1. Fluency, the learning of and practise in the skill or concept, for example the addition of three digit numbers in columns
2. Reasoning, children being able to explain their learning or apply it, eg correcting an addition calculation and explaining the mistake that has been made.
3. Problem solving, Using the skill or concept to solve a problem in various contexts, eg word problems.

All children, whatever their ability, will have opportunities for reasoning and problem solving activities and more able children will be stretched through this type of questioning.

### Y3 problem solving lesson

The question is:

A coach is three times as long as a car.  
A train is 6m longer than a coach.  
The train is 36m long.  
How long is the car?

This can be modelled using a bar model

<i>train</i>			<b>36m</b>
<i>coach</i>			<b>6m</b>
<i>car</i>	<i>car</i>	<i>car</i>	

The child can then use the skills learnt in the fluency part of the lesson to complete the necessary calculations to find the answer.