

## Use skilful questioning to promote conceptual understanding.

Mastery is not about doing repetitive questions. In fact, the beauty of mathematics itself, with or without mastery, is that it is infinitely stretchable. Questions can be solved in more than one way. Questions can be asked in more than one way.

For example, let's imagine a group of children are learning the 8 times table. Some will be quicker than others. Some may already recall the tables. Just because they can recall them, however, doesn't mean that they understand *why*.

"Why is  $8 \times 3$  the same as  $3 \times 8$ ?" "What does  $8 \times 6$  look like?" "Is  $8 \times 6 > 6 \times 9$ ?" These are just some of the ways the question can be asked or extended.

Each of these questions will make learners think beyond the simple calculation. A calculator can calculate; a brain can reason, question, explore... Brains were built for exactly that!

## **Use problems that can be extended for more able learners.**

The choice of tasks and questions used in the classroom are carefully considered and selected. The questions are set so everyone in the classroom can readily attempt them, falling within the overall knowledge bracket, but they are also suitable for simple extension to challenge and deepen understanding.

Continuing the tables theme, a question like “Find different ways to calculate  $12 \times 4$ ” can be very rich in answers

## **Use concrete pictorial and abstract (“CPA”) representation.**

More able learners can benefit as much as their peers from the use of CPA representation to visualise and represent mathematics in different ways.

Providing concrete material for everyone will facilitate more able learners' need to meet problems which are presented in different ways, in different contexts and with use of more varied vocabulary. Using the table question, more able learners may use counters or marbles to explain to a partner what  $6 \times 8$  looks like. Being able to articulate the mathematical thinking is a very important skill that we need our future mathematicians, engineers, teachers and doctors to have.

More able learners may also be encouraged to work in mixed-ability groups and asked to write a question based on a picture they see, or write a question that has a mistake in it... The options of extending a mathematical task are limitless and the more it happens, the more robust the mathematical foundation in our learners will be.

## **Allow time to explore, think and reflect.**

This is very important for all learning to happen. The mastery approach provides this. Reflecting on mistakes that a learner has made herself, or that someone else in the classroom made, is a very good strategy that can be used to clear any misconceptions, and is particularly effective through the learners' own voices. Having time for reflection is crucial in creating maps of knowledge that can be used in developing future concepts or embedding the roots of the existing ones.