Mastery in a Nutshell

Maths teaching for mastery rejects the idea that a large proportion of people 'just can't do maths'.
Mastery is characterised by a belief that, by working hard, **all children are capable of succeeding at mathematics.** On this basis, children are taught all together as a class and are not split into 'prior attainment' groupings.

Carefully structured teaching is planned in small steps. The small steps are connected and concepts are built. This leads to generalisation of the maths, and the ability to apply it to multiple contexts and solve problems.

A focus on exposing the **structure of mathematics** and developing an understanding of how and why maths works is crucial to mastery. A key skill of the teacher is to be able to represent the maths in ways that provide access and insight for pupils.

Teaching children **precise mathematical language** and insisting upon its use supports children's ability to think mathematically. Having the language and using it empowers children's ability to think about the concept.

Pupils are taught through **whole-class interactive teaching**, where the focus is on **all** pupils working together on the same lesson content at the same time. This ensures that all can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.

Lesson design identifies the new mathematics that is to be taught, the key points, the difficult points and a carefully sequenced journey through the learning. In a typical lesson, the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion.

If a pupil fails to grasp a concept or procedure, this is identified quickly and **early intervention** ensures the pupil is ready to move forward with the whole class in the next lesson.

Concrete materials, contexts, drawings, diagrams all play a role. These are discussed through opportunities for pupil-pupil and pupil-teacher talk, to develop reasoning, flexibility and adaptability in mathematical thinking

Memorisation and repetition of key facts (times tables and number bonds etc.) are important aspects of learning. Evidence from cognitive science research suggests that learning key facts so they can be recalled automatically 'frees up' working memory. It can then focus on more complex problem solving, rather than reaching cognitive overload trying to calculate simple operations. In terms of procedural fluency and conceptual understanding, one should not be prioritised over the other. Learning is most effective when the two are fully integrated.

Variation is applied to practice questions where attention is paid to the selection and order of the examples. Often just one aspect is changed whilst others are kept the same. The intention is to avoid mechanical repetition but instead to promote thinking to make connections. This is also known as 'intelligent practice' as it both reinforces pupils' procedural fluency and develops their conceptual understanding.
Variation theory has several dimensions, including use of multiple representations of what a concept is, and what it is not. It pays attention to what is kept the same and what changes, in order that pupils might reason. This means that they will make connections and build deep conceptual knowledge.

Significant time is spent developing deep knowledge of the key ideas that are needed to underpin future learning. The structure and connections within the mathematics are emphasised, so that pupils develop deep learning that can be sustained.