

A pupil really understands a mathematical concept, idea or technique if he or she can:

- describe it in his or her own words;
- represent it in a variety of ways (e.g. using concrete materials, pictures and symbols – the CPA approach)⁸
- explain it to someone else;
- make up his or her own examples (and non-examples) of it;
- see connections between it and other facts or ideas;
- recognise it in new situations and contexts;

- make use of it in various ways, including in new situations.⁹

Developing mastery with greater depth is characterised by pupils' ability to:

- solve problems of greater complexity (i.e. where the approach is not immediately obvious), demonstrating creativity and imagination;
- independently explore and investigate mathematical contexts and structures, communicate results clearly and systematically explain and generalise the mathematics.

Number and place value	<ul style="list-style-type: none"> • Large numbers of six digits are named in a pattern of three: hundreds of thousands, tens of thousands, ones of thousands, mirroring hundreds, tens and ones. It is helpful to relate large numbers to real-world contexts, for example the number of people that a local sports arena can hold.
Addition and subtraction	<ul style="list-style-type: none"> • Before starting any calculation is it helpful to think about whether or not you are confident that you can do it mentally. For example, $3689 + 4998$ may be done mentally, but $3689 + 4756$ may require paper and pencil. • Carrying out an equivalent calculation might be easier than carrying out the given calculation. For example $3682 - 2996$ is equivalent to $3686 - 3000$ (constant difference).
Multiplication and division	<ul style="list-style-type: none"> • Pupils have a firm understanding of what multiplication and division mean and have a range of strategies for dealing with large numbers, including both mental and standard written methods. They see the idea of factors, multiples and prime numbers as connected and not separate ideas to learn. • They recognise how to use their skills of multiplying and dividing in new problem solving situations. • Fractions and division are connected ideas: $36 \div 18 = 36/18 = 2$; $18/36 = 1/2$ • Factors and multiples are connected ideas: 48 is a multiple of 6 and 6 is a factor of 48.
Fractions	<ul style="list-style-type: none"> • Representations that may appear different sometimes have similar underlying ideas. For example $1/4$, 0.25 and 25% are used in different contexts but are all connected to the same idea.
Measurement	<ul style="list-style-type: none"> • The relationship between area and perimeter is not a simple one. Increasing or decreasing area does not necessarily mean the perimeter increases or decreases respectively, or vice versa. • Area is measured in square units. For rectangles, measuring the length and breadth is a shortcut to finding out how many squares would fit into each of these dimensions.
Geometry	<ul style="list-style-type: none"> • During this year, pupils increase the range of 2-D and 3-D shapes that they are familiar with. With 3-D shapes they think about the faces as well as the number of vertices and through considering nets think about the 2-D shapes that define the 3-D shapes. • Pupils learn about a range of angle facts and use them to describe certain shapes and derive facts about them. • Regular shapes have to have all sides and all angles the same. Although non-square rectangles have four equal angles, the fact that they do not have four equal sides means that they are not regular. • Some properties of shapes are dependent upon other properties. For example, a rectangle has opposite sides equal because it has four right angles. A rectangle is defined as a quadrilateral with four right angles. It does not have to be defined as a quadrilateral with four right angles and two pairs of equal sides.
Statistics	<ul style="list-style-type: none"> • Different representations highlight different aspects of data. It is important to be able to answer questions about data using inference and deduction, not just direct retrieval.