

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"> • The value of a digit is determined by its position in a number. • Place value is based on unitising, treating a group of things as one 'unit'. This generalises to 3 units + 2 units = 5 units (where the units are the same size).
Addition and subtraction	<ul style="list-style-type: none"> • Relating numbers to 5 and 10 helps develop knowledge of the number bonds within 20. For example, given $8 + 7$, thinking of 7 as $2 + 5$, and adding the 2 and 8 to make 10, then the 5 to 15. This should then be applied when calculating with larger numbers. • Subtraction bonds can be thought of in terms of addition: for example, in answering $15 - 8$, thinking what needs to be added to 8 to make 15. Counting on for subtraction is a useful strategy that can also be applied to larger numbers.
Multiplication and division	<ul style="list-style-type: none"> • It is important for children not just to be able to chant their multiplication tables but also to understand what the facts in them mean, to be able to use these facts to figure out others and to use in problems. It is also important for children to be able to link facts within the tables (e.g. $5 \times$ is half of $10 \times$). • They understand what multiplication means, see division as both grouping and sharing, and see division as the inverse of multiplication.
Fractions	<ul style="list-style-type: none"> • Fractions are equal parts of a whole. • Equal parts of shapes do not need to be congruent but need to be equal in area. • Decimal fractions are linked to other fractions. • The number line is a useful representation that helps children to think about fractions as numbers.
Measurement	<ul style="list-style-type: none"> • Developing benchmarks to support estimation skills is important as pupils become confident in their use of standard measures. The height of a door frame, for example, is approximately 2 metres, and a bag of sugar weighs approximately 1 kilogram.
Geometry	<ul style="list-style-type: none"> • During this year there is an increasing range of shapes that pupils are familiar with. The introduction of symmetrical and non-symmetrical polygons and the requirement that pupils should be able to draw them will give rise to discussions about lengths of sides and sizes of angles. Pupils need to appreciate these features as properties of shapes as well as the number of sides and vertices. • Pupils recognise that angles are about the amount of turn – the lengths of the lines used to represent angles do not affect the size of the angle. • Pupils recognise that relationships are at the heart of properties of shapes, not particular measurements. For example, the opposite sides of any rectangle will always be equal, not that rectangles have a pair of long sides and a pair of short sides.
Statistics	<ul style="list-style-type: none"> • Data need to be collected with a question or purpose in mind. Tally charts are used to collect data over time (cars passing the school, birds on the bird table). They can also be used to keep track of counting.