

Representing Numbers

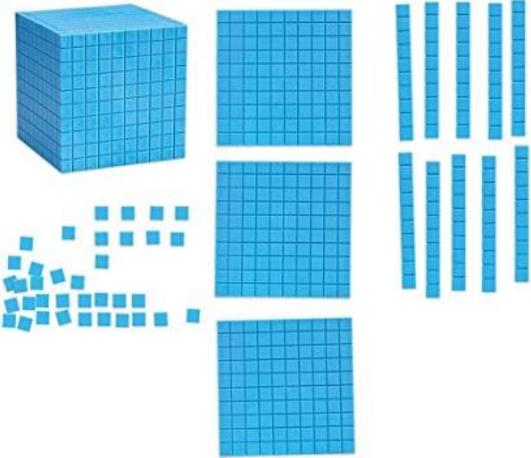
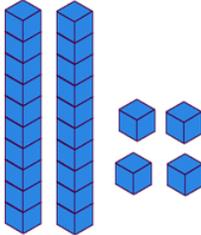
At Hovingham and St Hilda's Federation, we teach a mastery approach to Maths. Mastery means that children gain a solid understanding of Maths that enables them to move on to more advanced material.

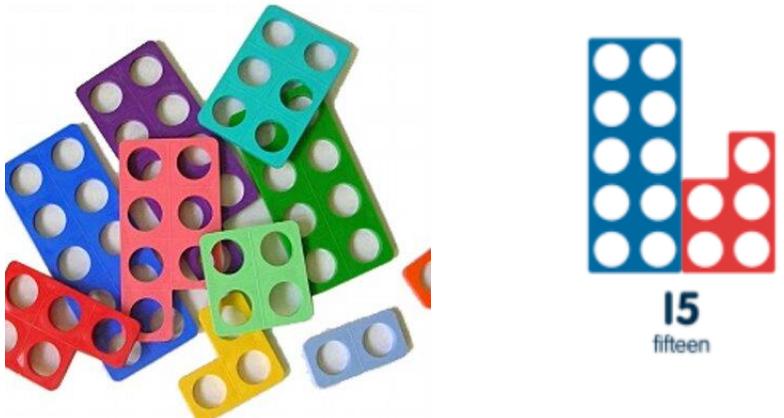
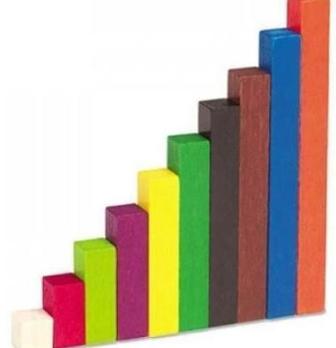
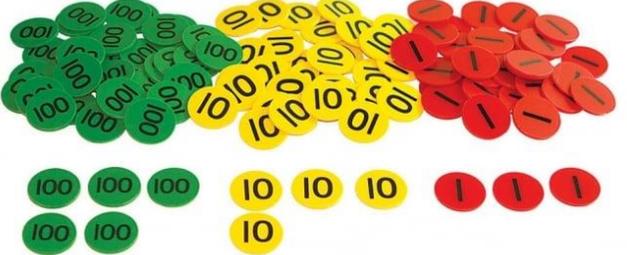
Variation in the way that we represent number helps children to gain an understanding of Mathematical structures. It allows children to access concepts, make connections and spot patterns in Maths. The aim in using representations is that pupils will internalise structures and representations of number in order to do maths without them.

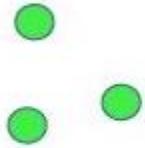
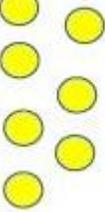
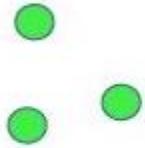
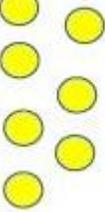
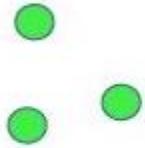
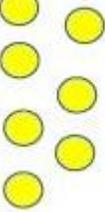
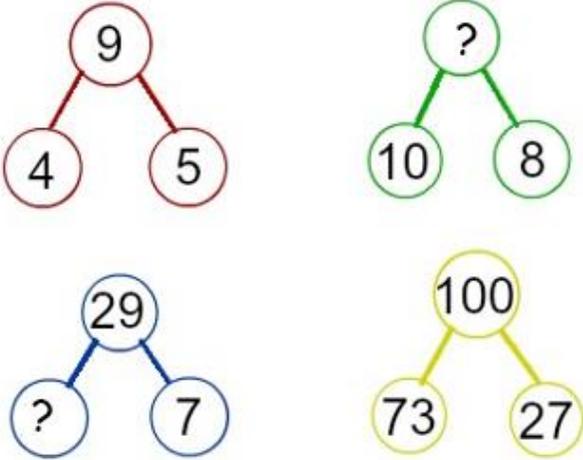
Below you can find some pictures of some of the main representations that we use at school and a summary of how they support your child in a mastery approach to maths.

Interactive versions of some of these representations can be found here: <https://mathsbot.com/>

The versions on this website can be used to support your child with their homework or any other Maths work at home.

| Name | Picture | Application |
|----------|---|--|
| Base ten |  <p>The large cube is equal to 1000 The square is equal to 100 The stick is equal to 10. The small cubes are equal to 1.</p> | <p>Base ten is used to represent numbers. It supports children's understanding of how numbers are made up. For example:</p>  <p>We can see two tens and four ones. The number represented is 24.</p> <p>Children also use drawings of these materials to support them in their work. For example, if a child is working out $42 + 54$, they may draw the numbers in base ten first and then count them to work out their answer.</p> |

| | | |
|-----------------------------|--|---|
| <p>Numicon</p> |  A collection of various colorful Numicon shapes (blue, purple, teal, green, red, yellow, light blue) scattered on the left. On the right, a specific Numicon shape representing the number 15 is shown, consisting of a blue vertical bar of 10 dots and a red horizontal bar of 5 dots attached to its right side. Below this shape, the number '15' and the word 'fifteen' are written. | <p>Numicon is also used to represent numbers. There is a numicon shape for each number from 1-10. For example, the pink shape in the picture is the number 7.</p> <p>Numicon can also help to represent teen numbers as being ten plus another number, as seen in this picture representing 15.</p> |
| <p>Cuisenaire rods</p> |  A set of Cuisenaire rods of various colors (white, red, light green, purple, yellow, green, brown, blue, orange) and lengths, arranged in a row to show their increasing sizes. | <p>Cuisenaire rods are small sticks of varying sizes. They can be used for a variety of purposes, for example representing and comparing numbers and representing fractions.</p> |
| <p>Place value counters</p> |  A collection of place value counters. There are green circular counters labeled '100', yellow circular counters labeled '10', and red circular counters labeled '1'. Below the main pile, there are smaller groups of these counters: two groups of three green '100' counters, two groups of three yellow '10' counters, and one group of three red '1' counters. | <p>Each counter is labelled according to the place value it represents.</p> <p>These are used to represent numbers. They can also be used on place value charts (see below).</p> |

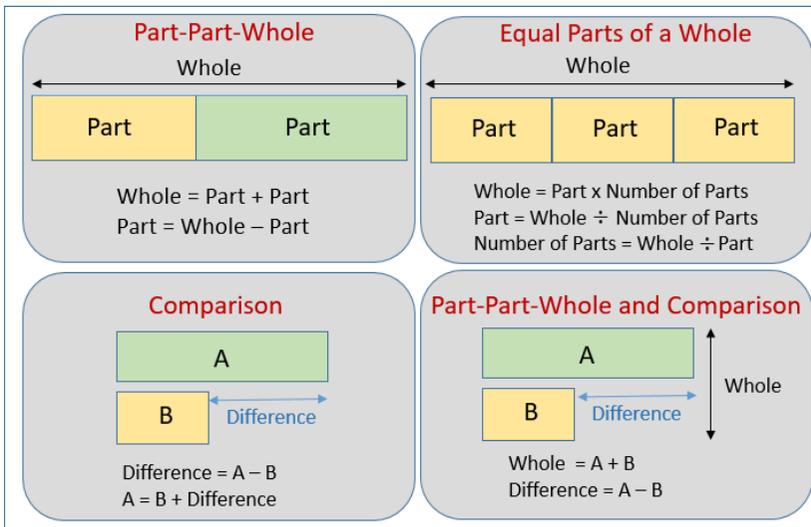
| <p>Place value charts</p> | <table border="1"> <thead> <tr> <th data-bbox="465 197 656 248">Hundreds</th> <th data-bbox="656 197 840 248">Tens</th> <th data-bbox="840 197 1019 248">Ones</th> </tr> </thead> <tbody> <tr> <td data-bbox="465 248 656 518">  </td> <td data-bbox="656 248 840 518">  </td> <td data-bbox="840 248 1019 518">  </td> </tr> </tbody> </table> | Hundreds | Tens | Ones |  |  |  | <p>Place value charts are used to develop children's understanding of number. In the picture, there are 3 hundreds, 7 tens and 2 ones. The number represented is 372. Children begin to understand that the '7' digit in 372 represents 7 tens.</p> |
|---|--|--|------|------|---|---|---|---|
| Hundreds | Tens | Ones | | | | | | |
|  |  |  | | | | | | |
| <p>Part whole models</p> |  | <p>Part whole models show two or more parts that make up the whole (the number in the top circle).</p> <p>These can be used for calculations, or to show place value. For example that 8 tens + 4 ones = 84.</p> | | | | | | |

Multi-link
cubes or links

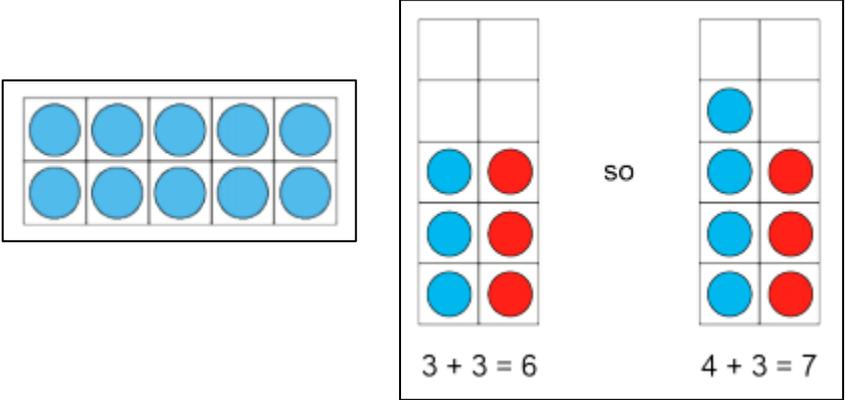


Cubes and links are useful tools to support children with counting. They also help children in their early experience of addition and subtraction. For example, to calculate $5 + 3$, pupils might count out five cubes and a further three cubes and then count how many they have altogether.

Bar models



Bar models are used to help children see calculations visibly and understand what they need to work out. They have many different applications, as see in the picture.

| | | |
|---------------------|--|---|
| <p>Tens frames</p> |  | <p>A tens frame is a grid that has 10 boxes.</p> <p>Children can place counters in the boxes to help them count and visualise numbers to ten, as seen in the first image of a tens frame full of blue counters.</p> <p>In the second picture, different colours have been used to support children in their understanding of addition.</p> |
| <p>Numberblocks</p> |  | <p>In Reception, children use the Numberblocks scheme to learn about representations of number. Each numberblocks character is named after the number of blocks they are made of.</p> <p>In the episodes, the numberblocks characters frequently change their formation, as can be seen from the two different pictures of number 5 here.</p> <p>This shows children that even if they look a different shape, they still have the same number of blocks.</p> |