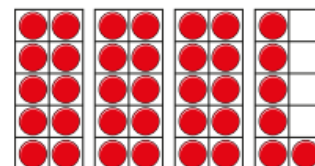
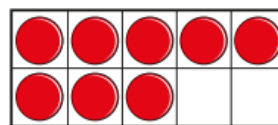
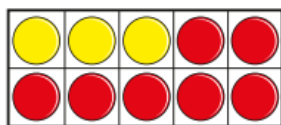
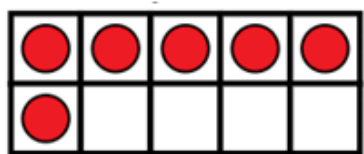


Maths Knowledge Organiser

Resources and Representations

Ten Frame



Complete the fact family to match the ten frames.

$$\underline{\quad} + \underline{\quad} = 18$$

$$18 - \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} + \underline{\quad} = 18$$

$$18 - \underline{\quad} = \underline{\quad}$$

<https://youtu.be/wdihNGzlrZQ> - How to use a ten frame.

<https://youtu.be/4VshxFr8RAo> - Miss Breakell

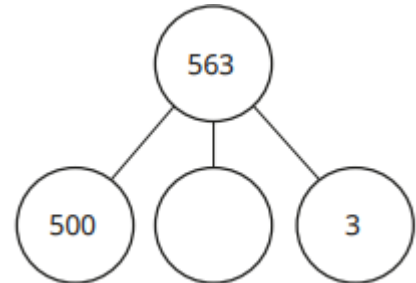
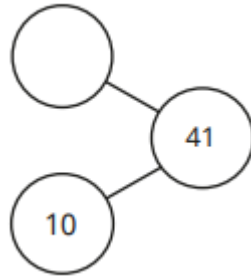
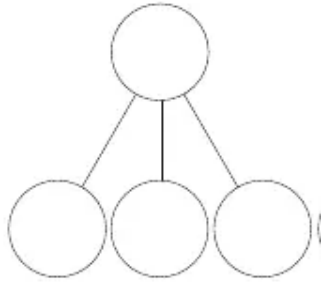
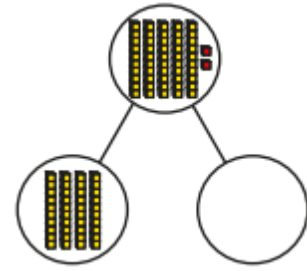
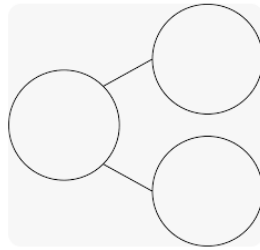
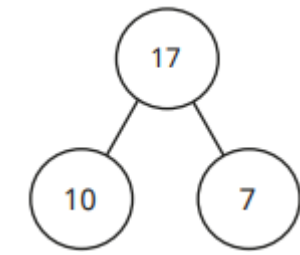
This resource is primarily used in Reception, Year One and Year Two. We sometimes use more than one ten frame, if we are working with numbers above 10. To make 14, we would use two ten frames. 10 on one and 4 on another. 10 and 4 more makes 14. We also use them to add and subtract, as well as find number bonds to 10 and 20.

Numicon



Each Numicon shape represents a number from 1-10. We use these shapes to help with adding, subtracting, finding number bonds, learning about odd and even numbers, fractions and much more! The children are able to hold each Numicon piece and it helps them learn the value of each number. They are helpful when learning about odd and even numbers.

Whole part model



<https://youtu.be/tEJeeqvgopU> - starting to use a whole part model.

<https://youtu.be/wSpTLTE907Y> - using a whole part model for tens and ones.

<https://youtu.be/dNI37544K2U> - Miss Breakell

These are used from Reception, through to Year Four. Whole part models help to partition numbers. Partitioning means to split a number into two or more groups. This can help with addition, subtraction and many other aspects of mathematics. The whole part model can be seen in any orientation.

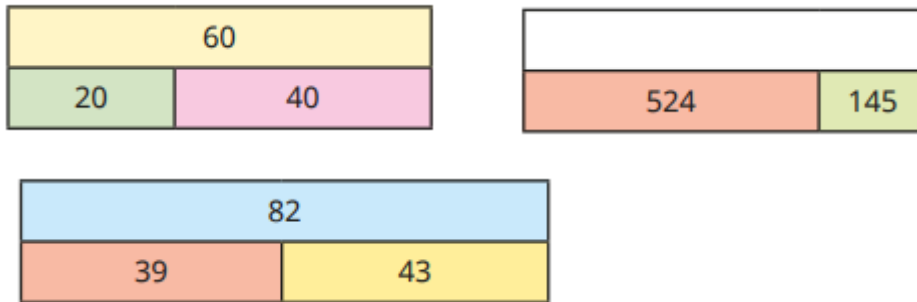
$$7 = 4 + 3 \quad \text{or} \quad 5 + 2 \quad \text{or} \quad 6 + 1 \quad \text{or} \quad 7 + 0$$

$$43 = 40 + 3$$

$$153 = 100 + 50 + 3$$

There is always more than one way to partition a number, but generally, we use whole part models to partition a number into hundreds, tens and ones. We also use them to find number bonds.

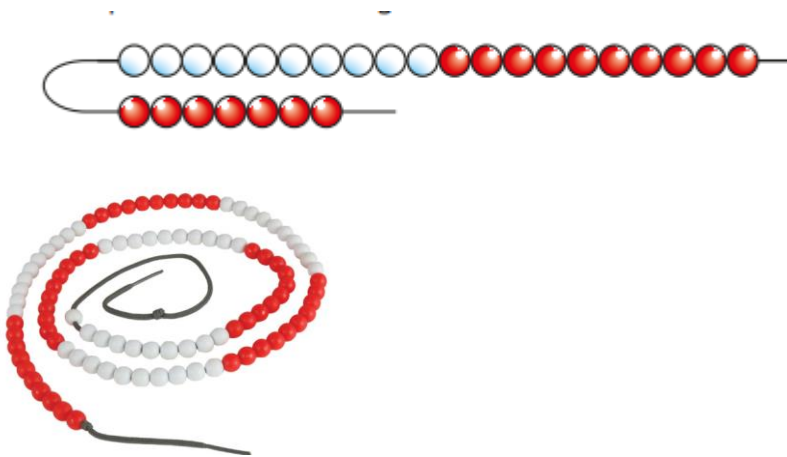
Bar Model



<https://youtu.be/cpEBG-T95cQ> - Using a bar model to add and subtract

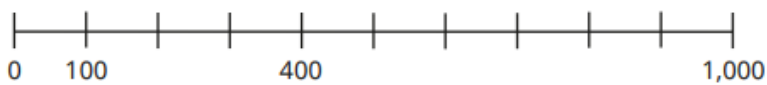
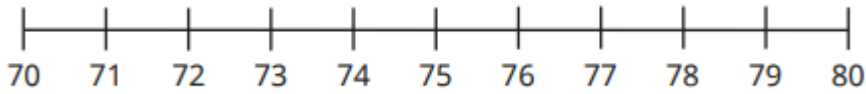
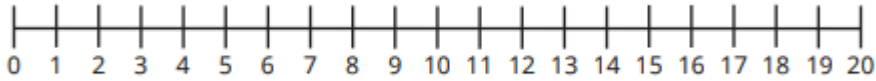
A bar model is similar to a whole part diagram. The top row shows the whole, and the bottom section is split to show the parts. Using this representation quickly shows that the two parts are equal to the whole. The other difference between a bar model and whole part diagram, is the location of the vertical line. Where the second row is split, shows roughly the size of each part. So, on the first example, 20 is the smaller part, so the split is to the left.

Bead string



Beads strings are used across the school. There are either 20 or 100 beads on each string, and they are split into groups of 10, alternating between two colours. They help children to recognise and make numbers to 100, by quickly moving beads in groups of tens.

Number Lines



$$2+2+2+2 = 8$$
$$4 \times 2 = 8$$

We use a variety of number lines from Reception to Year Four. Number lines can go forwards or backwards. They can go up or down in increments of 1 or any other number.

We also use blank number lines, for estimating, adding, subtracting and much more.

We can use our partitioning skills (splitting a number), on a number line, to help us add and subtract.

$$52 + 17 =$$

We can partition 17 into 10 and 7, then use a number line to add 10, then 7 to 52.

Number track

| | | | | | | | | | | |
|---|---|---|--|--|--|--|--|--|--|--|
| 0 | 1 | 2 | | | | | | | | |
|---|---|---|--|--|--|--|--|--|--|--|

| | | | | | | | | | | |
|----|----|----|--|--|--|--|--|--|--|--|
| 10 | 11 | 12 | | | | | | | | |
|----|----|----|--|--|--|--|--|--|--|--|

| | | | | | | | | |
|--|---|---|--|--|--|--|----|--|
| | 7 | 8 | | | | | 13 | |
|--|---|---|--|--|--|--|----|--|

| | | | | | | | | | |
|--|--|-----|-----|--|-----|--|--|-----|--|
| | | 200 | 300 | | 500 | | | 800 | |
|--|--|-----|-----|--|-----|--|--|-----|--|

A number track is similar to a number line, apart from the numbers are in boxes.

100 square

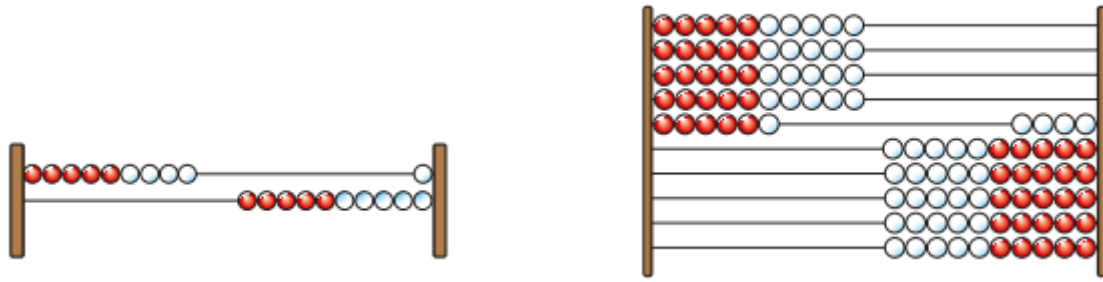
| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

<https://youtu.be/blJL-t4kthQ> - How a 100 square might be used

In Reception and the beginning of Year One, we start with the first part of the 100 square, often focusing on 1-20. We then move to the whole square.

A 100 square is organised in rows of 10, making adding and subtracting quick and efficient.

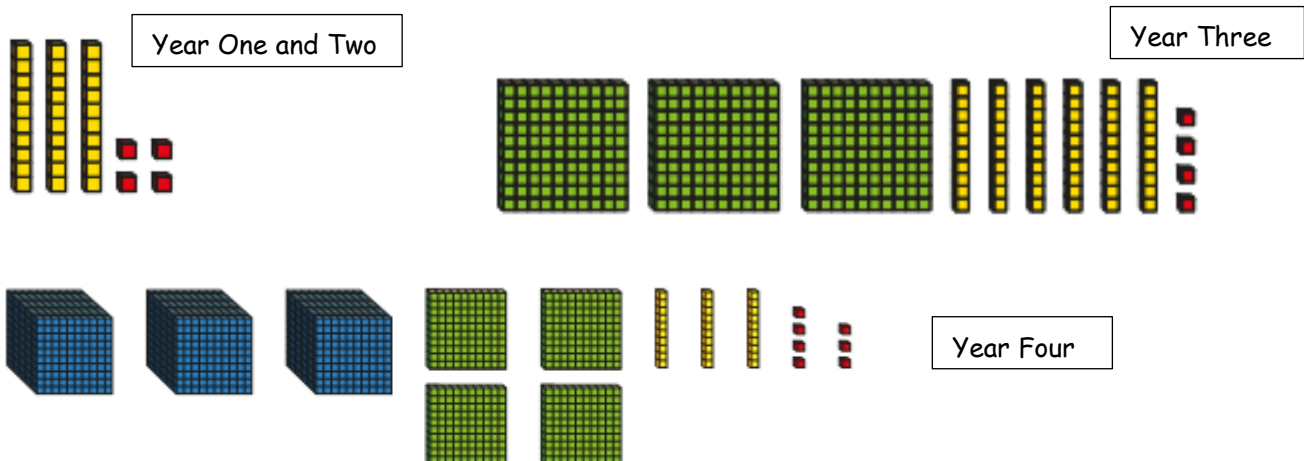
Rekenrek



https://youtu.be/CKWWVHs9w_A - Ways to use a Rekenrek

A Rekenrek is very similar to a 100 square, but without the numbers! Again, we start with just 1-20 beads and then move to 1-100. Each row has 10 beads. 5 are red and 5 are white. This helps the children to quickly see patterns in numbers. When the beads reach 50, the colours swap. We use them to help us gain a better understanding of place value, to count, add, subtract and much more.

Base ten



Base ten represent numbers. We start with ones, then have tens, hundreds and thousands. Children can quickly make a number using the base ten. We start by using concrete apparatus and the children move to seeing the base ten in picture form, as above. They can also quickly draw their own to help them. As with many resources, base ten can be used in many ways. We can make numbers, add, subtract and much more.

Place value charts and Place value counters

Year Two

| Tens | Ones |
|------|------|
| | |

Year Three

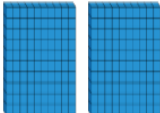
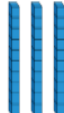

| H | T | O |
|---------|----|-------------------|
| 100 100 | 10 | 1 1 1 1 1 1 |

Year Four

| Th | H | T | O |
|---|--------------------|-------|-----------------|
| 1,000 1,000 1,000 1,000 1,000 1,000 | 100 100 100 100 | 10 10 | 1 1 1 1 1 |

| Hundreds | Tens | Ones |
|-----------------|-------------|--------------|
| 100 100 100 | 10 10 10 10 | 1 1 1 1 1 |
| 100 100 100 100 | 10 10 10 | 1 1 |

An example of adding.

| Hundreds | Tens | Ones |
|---|---|---|
|  |  |  |

An example of using base ten on a place value chart.

<https://youtu.be/DTZqgYRoxYU> - Adding

<https://youtu.be/-owEFIRHYeI> - Regrouping when adding

<https://youtu.be/VyLfbeUQvUs> - Multiplying - Year Three

We start to use place value counters in Year Two, starting with just the tens and ones columns. In Year Three we introduce the hundreds column and the thousands in Year Four.

We use the place value counters alongside place value charts. We can also use base ten with place value charts. The place value counters are the next step, when children are confident using base ten. Sometimes we start with base ten and then move to place value counters, all in the same lesson.

Concrete - Pictorial - Abstract

<https://youtu.be/R4IcEZiZejw> - CPA explained

Whilst teaching any mathematical concept, we use the stages concrete, pictorial and then abstract.

Concrete is using actual objects the children can hold.

Pictorial moves to using pictures and drawings.

Abstract means using symbols and numbers.

We work through each stage, to help ensure all children have a solid understanding of each new concept.